A CHILTON PUBLICATION

The Iron Age

THE NATIONAL METALWORKING WEEKLY

June 14, 1951

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Lubrication's sure and easy on Rocker Arm Straightener

Multival Centralized System is standard equipment

USERS of this Impco rocker arm straightening machine are pleased with its smooth, trouble-free operation. Lubrication is no problem because every machine is equipped by the manufacturer with a Multival Centralized Lubricating System.

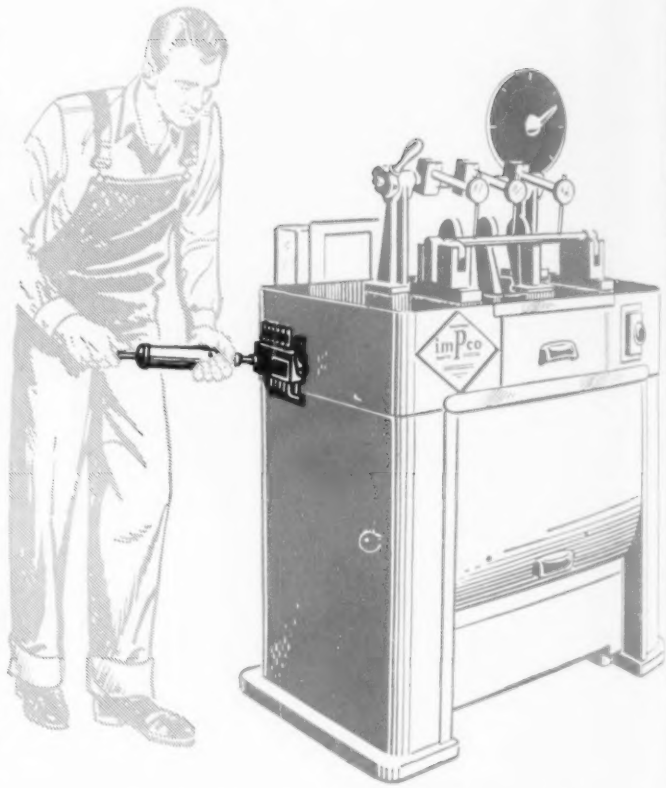
Multival is simple, streamlined and efficient—low in cost, easy to install and easy to operate. There is no fuss, no muss, no waste, no burned out bearings, no shutting down the machine for lubrication.

A man with a grease gun makes one connection at the Multival Block. With a single stroke, he fills all the measuring valves, which at the same time deliver an exactly measured quantity of oil or grease to each bearing served by the system. The system can be operated as often or as seldom as necessary, and the amount of lubricant delivered is adjustable to each individual bearing need, so that no bearing gets too much or too little.

Multival is a Farval-engineered product, incorporating the unique Farval valve and piston design. The Farval valve is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Wide valve ports and full hydraulic operation insure unfailing delivery of grease or oil to each bearing—as much as you want, exactly measured—as often as desired.

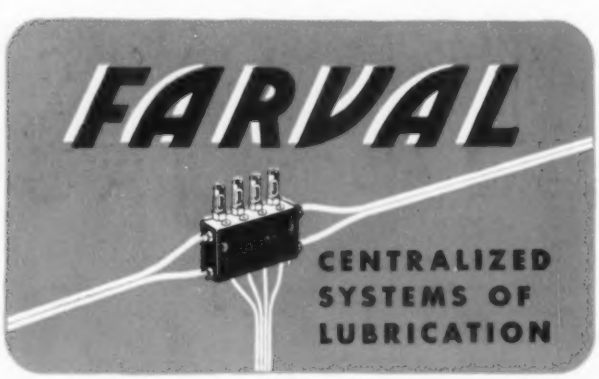
Write for Multival Bulletin 15 or Farval Bulletin 25. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



● *Greasing this rocker arm straightener takes only a few minutes, because it is Multival-equipped. For larger machines for straightening crankshafts, this machinerybuilder, Industrial Metal Products Corporation of Lansing, Mich., has standardized on Farval Centralized Systems of Lubrication.*

FARVAL—*Studies in Centralized Lubrication* No. 125



Bring Us Those "DIFFICULT" Casting Jobs

Because we're equipped so thoroughly to make large, intricate castings, we suggest you check with us first of all when you need this kind of work.

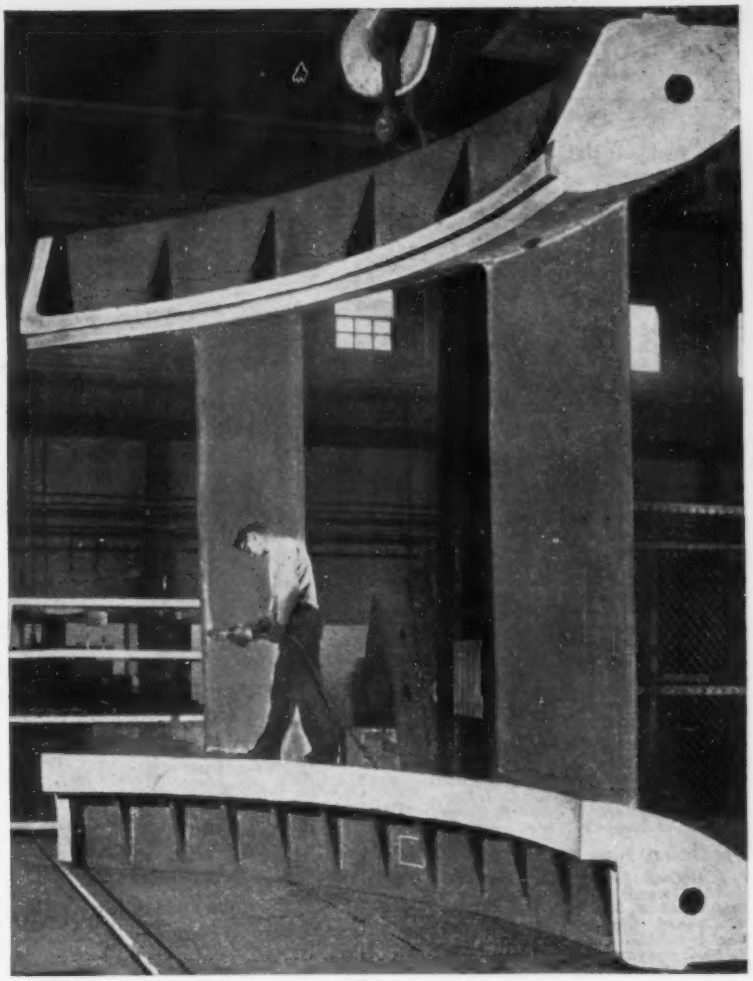
Bethlehem's foundry practice is up-to-the-minute, and Bethlehem has the added advantage of excellent machine-shop facilities. So, when you require a hard-to-make casting in iron, steel, or bronze, be sure you investigate the many unusual services we can offer. We're set up to do the job you want, and our engineers will expedite matters by working closely with you.

Naturally, we also welcome the simpler types of casting work; at Bethlehem they're handled as conscientiously as the big, involved assignments. You are assured of our whole co-operation, whether the job is large or small, tough or easy.

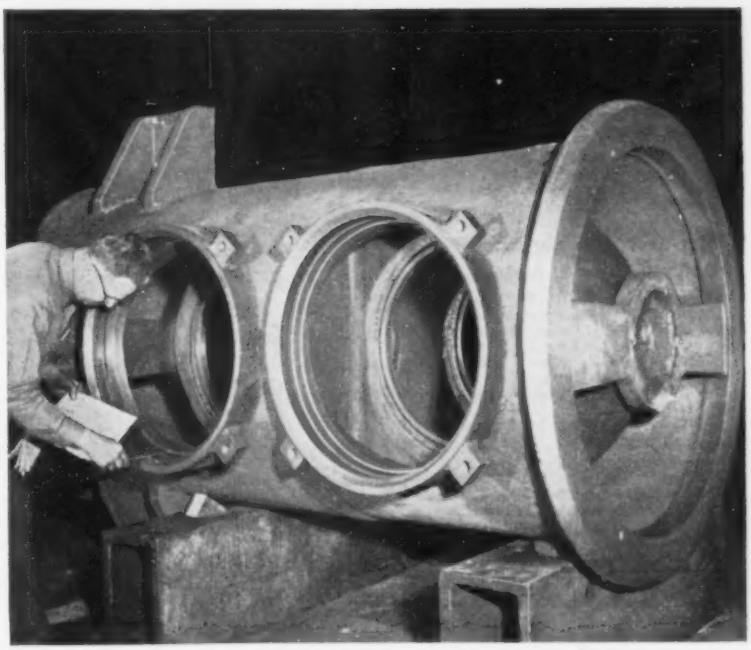
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★



This huge cast-steel speed ring segment, made at the Bethlehem foundry, will be part of an important hydroelectric installation. Weight of segment, 42,600 lb.



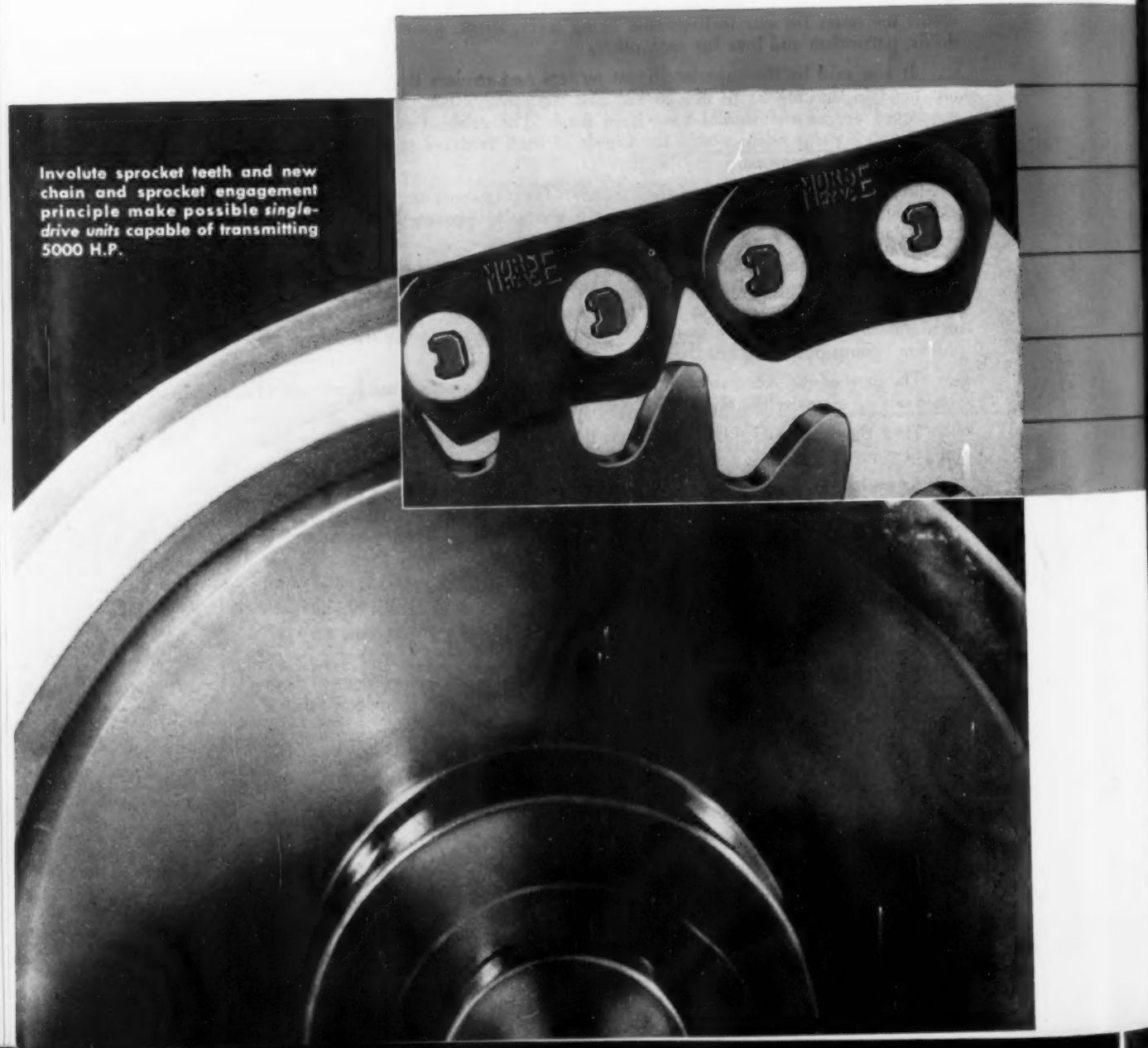
Bethlehem's casting, welding, and machining services were combined in the making of this valve-body assembly, which was designed for use with a mercury vapor turbine. The complete assembly consists of several alloy castings welded together and machined to very close tolerances. Weight, 17,025 lb.

Now—
more than ever

M=PT

Morse *means*
Power
Transmission

Sensational, new transmits more speeds than any



Involute sprocket teeth and new chain and sprocket engagement principle make possible *single-drive units* capable of transmitting 5000 H.P.

IRON AGE *summary*

iron and steel industry trends

Policy makers facing big question . . . NPA shines spotlight on inventories . . . Some in industry question military lead time.

How Far?—This week the stampede to gain protection under the CMP umbrella is testing the durability of controls machinery to the core. Industries included under CMP are vying for larger shares of basic metals. Those not included are carefully but quickly collecting evidence that they are essential—or at least more so than some who have gotten the nod from NPA.

Producers of basic metals are asking pointedly, "How far shall we go on controls?" There is no doubt that government controls policymakers will be asked again to answer this basic question.

Hanging On—This week they are facing pressure from three factions which believe: (1) Because 75 pct or more of basic metals production will be distributed under CMP, the plan should be extended to include total output. (2) CMP is slated to control too much of the economy; a sharp line should be drawn limiting priority to strictly military goods. (3) The present plan isn't even in operation yet; it should be given a chance to work.

Even the policymakers agree that they have a bull by the tail and it may be hard to let go without getting hurt. They are counting heavily on great expansion of basic metals output to slow the onrushing demand and lift them well above its horns. Actually, if they can survive the next year, achievements in industrial expansion and production might make them look good.

Treading Water—Present strategy leaves them treading water. They will try to meet fire with fire; hold the line as long as possible; compromise when it's prudent; and change the rules when they must. But their main objective is to keep the controls ship afloat until higher production comes to the rescue. Not an easy job.

During the months immediately ahead you'll hear a lot more about lead time and inventory than you have for a long time. NPA's compliance division is preparing to reach out a lengthening arm of investigation into these vital market factors. For this purpose investigators are being loaned to them from the Dept. of Justice and Federal Trade Commission.

Hidden Treasure—Of course inventory must be accumulated before defense production can get rolling. But a criticism heard increasingly in industry is that some military buying and lead time is unrealistic. Part of the answer is that civilian mass production industries have learned to operate almost out of trucks and freight cars when necessary. But the military is aiming at (1) positive assurance of delivery, plus (2) alternate producers wherever possible.

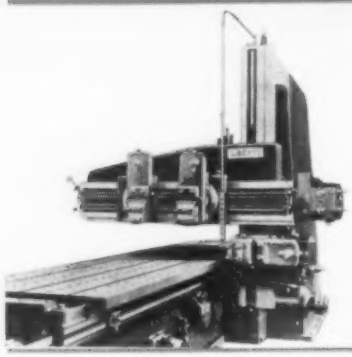
Under CMP, metal left on hand at the end of a quarter will be subtracted from requirements during the next quarter. But NPA isn't waiting for the books to reveal this hidden treasure. They know a closer check on inventory and lead time can take a little pressure off demand now instead of several months later.

First CMP Orders—A few steel orders bearing the CMP label are beginning to show up. Those received so far are for military and atomic energy commission end uses. The feeling is that these orders will build up gradually. Meanwhile, mills are turning down substantial tonnages of DO orders for the third quarter. This is particularly true of hot-rolled bars and plates.

Steelmaking operations this week are scheduled at 103.5 pct of rated capacity, unchanged from last week.

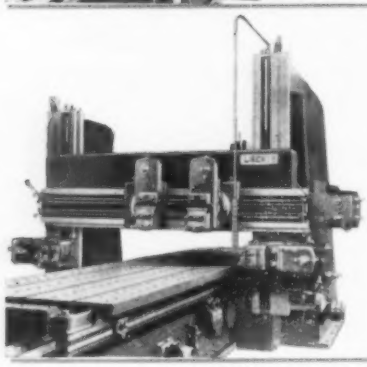
(Nonferrous summary p. 152)

LIBERTY BUILDS 3 *great* PLANERS



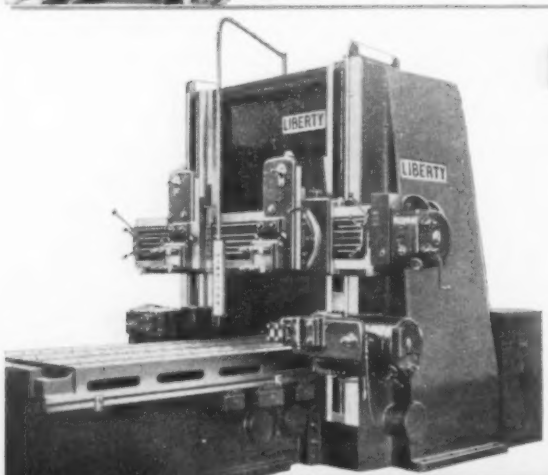
OPEN SIDE

For shops handling work of variable widths. Wide-faced housing and motorized clamp give rigidity for heavy roughing cuts and finishing. Dual control; electric feeds; rapid traverse to all Heads in all directions.



CONVERTIBLE

For exceptional rigidity on variable widths. Two, three or four heads. Offset heads permit closest approach of tools. Double balanced driving gear and pinions. Extreme accuracy.



DOUBLE HOUSING

For rapid production combined with accuracy. Two, three or four heads. Extremely rigid; handles production work with maximum cutting feeds and speeds. Table pulled into tool. Electric clamping and dual control for ease of operation; high production.

Write for catalog giving complete details.

All lengths, 24″ x 24″ wide and larger.

LIBERTY PLANERS, INC.

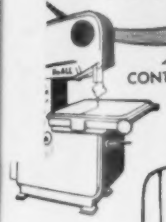
HAMILTON, OHIO

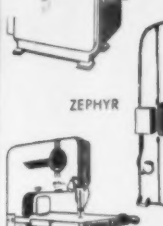
GENERAL DISTRIBUTORS: BRYANT MACHINERY & ENGINEERING COMPANY, 400 W. MADISON ST., CHICAGO 6

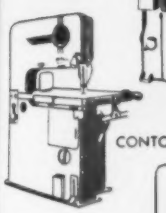
Exclusive Representatives in All Principal Cities

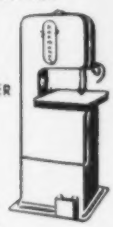
DoALL

INDUSTRY'S NEW SET OF TOOLS


CONTOUR-MATIC


ZEPHYR

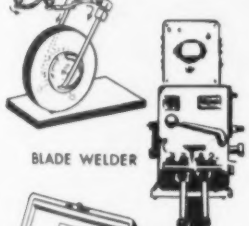

CONTOUR


BAND FILER


TOOLROOM GRINDER


CRUSH GRINDER


"COOL GRINDING" ATTACHMENT

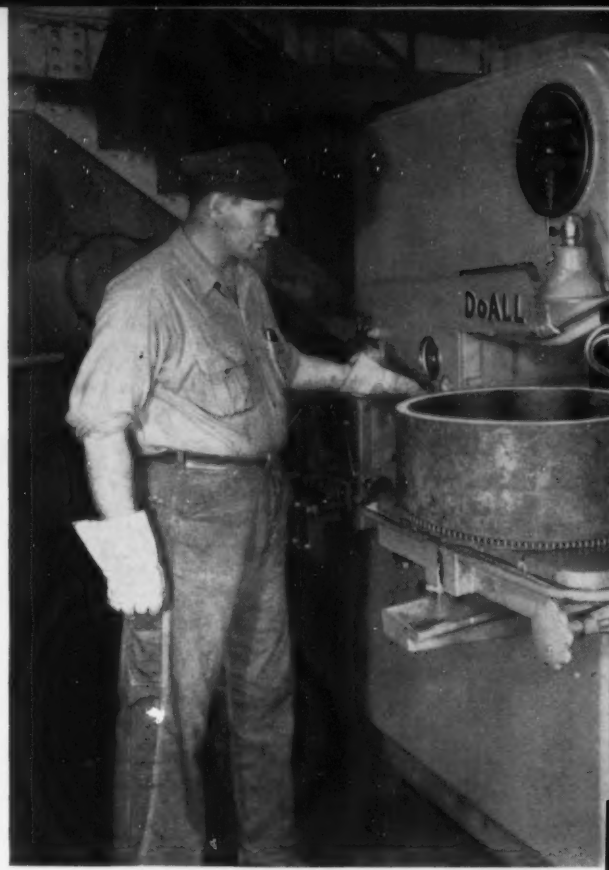

BLADE WELDER


GAGE BLOCKS


GAGE ACCESSORIES


VARIABLE SPEED DRIVES

SAW BANDS



National Acme Company, Cleveland, reduces cost of cams and gears. One of the first steps in production of Acme cams is splitting the ring shown above into segments. DoALL MP-20 makes cut through 9¼ x 1⅛" wall thickness in three minutes.

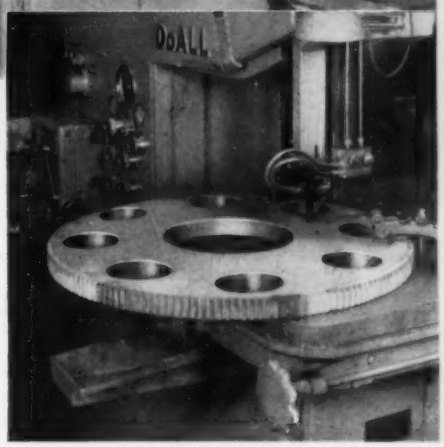
It's EASY TO SAVE . . .

MANPOWER — Hydraulic controls and power feed simplify operation and increase output. Operators attain skill in short time. Reduces labor cost.

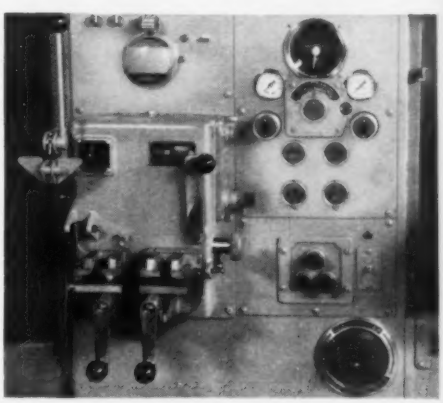
MACHINE POWER — Preliminary metal removal and shaping by hydraulic powered band machining technique saves time of more costly machines. Expanded speed range and new Band Tools cut any material.

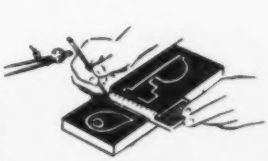
MATERIAL — Band Machining technique cuts directly to layout line, removing surplus metal in usable form in record time. Reduces scrap loss — less chips, less waste.

SEE IT DONE ON THE MODEL MP-20 — Ask our Machine Tool Specialist to demonstrate the CONTOUR-MATIC Band Machine that creates entirely new manufacturing possibilities.



Tough alloy gear 1¾" thick is split in 16 minutes "floor to floor time." MP-20 provides required band speed and feed pressure.


Centralized operating panel controls speed of tool, feed pressure of table, welding the tool, and coolant facilities.


TOOL STEEL


BENCH FILER

IRON AGE *introduces*

Gen. Lucius D. Clay, elected a member of the board of directors of GENERAL MOTORS CORP., New York.

Ward A. Wickwire, becomes president of the new SALEM-BROSIUS, INC., Pittsburgh. Other officers named: **Ward A. Wickwire, Jr.,** executive vice-president; **Frank E. Myers,** vice-president in charge of operations; **H. W. Eddy,** vice-president and controller; and **Carl J. Westling,** chief engineer.

Joseph W. Eskridge, named vice-president in charge of manufacturing for HUDSON MOTOR CAR CO., Detroit. **R. G. Waldron,** appointed vice-president in charge of industrial relations.

Harry E. Thiele, elected vice-president with duties to be assigned by the president of GENERAL STEEL CASTINGS CORP., Granite City, Ill. **Luther A. Kleber** was elected vice-president-manufacturing and **J. Ellis Turner** was elected vice-president in charge of industrial relations.

Norman W. Rowand, appointed general manager of the Pittsburgh plant of ROCKWELL MFG. CO.'s Meter and Valve Div.

Robert G. Stacy, appointed head of Railway Disc Brake Sales for the BUDD CO., Philadelphia. **Henry F. Blankenbiller,** made manager of the Railway Service Dept., succeeding Clyde C. Elmes who is retiring.

Byron A. Fay, elected vice-chairman of the board of ELECTRIC AUTO-LITE CO., Toledo. **H. E. Hasemeyer** named executive vice-president; and **Joseph H. Lambrix,** vice-president and director of purchases.

K. C. Culham, elected president and a director of EMPIRE-HANNA COAL CO., LTD., Toronto, succeeding John R. Frith, who resigned but continues as a director. **James N. Sherwin** becomes a director and **J. F. Brooke** and **George R. Cooper,** vice-presidents.

Frank H. Bishop, elected executive vice-president of ALLIED PRODUCTS CORP., Detroit.

Walter C. Bladin, appointed assistant to the vice-president of BURNSIDE STEEL FOUNDRY CO., Chicago.

W. N. Farquhar, named works manager of the new plant at Wenatchee, Wash., of ALUMINUM CO. OF AMERICA, Pittsburgh.

Charles L. Wheeler, Jr., named works manager of Mead, Wash., plant of PACIFIC NORTHWEST ALLOYS CO., succeeding **W. T. McGinnis,** who resigned to become assistant to the president of KEOKUK IRON WORKS, Iowa.

B. C. Adams, Jr., elected vice-president of TEXAS GAS TRANSMISSION CORP. and **Edward T. Bowers** named comptroller.

William N. Brand, appointed superintendent of the electric furnace melt shop of HOSTER STEEL CORP., Oklahoma City, Okla.

William Porter Goodman, general superintendent of the Chicago Heights plant of INLAND STEEL CO., Chicago, succeeds Crawford B. Murton, works manager, who is retiring, without change in title.

E. MILTON BARBER, appointed executive vice-president and director of Pittsburgh Steel Co., Pittsburgh.

RALPH W. BURK, elected vice-president of manufacturing for Kearney & Trecker Corp., Milwaukee.

DONALD H. McIVER, elected vice-president in charge of industrial sales for Ex-Cell-O Corp., Detroit.

IRON AGE

salutes

Thomas E. Millsop

IN Weirton, W. Va., folks like Tom Millsop, president of Weirton Steel Co. Last week they re-elected him to another 4-year term as mayor of Weirton.

Tom, Weirton's first mayor, was elected to political office in a steelmaking town by a five-to-one majority. It's a testimony to the high confidence and loyalty he commands and to his extraordinary ability.

The soft-spoken, tobacco-chewing steelman earned this confidence. He's a shirt-sleeve executive who started as an openhearth helper for Carnegie Steel. As riveter, foreman, purchasing agent, scrap salesman and production manager he learned steelmaking from hearth floor up. He joined Weirton as salesman in 1927 and was made president in 1936.

There hasn't been a strike at Weirton in 17 years. Big reason for that record is the way Tom Millsop feels about people. He hears both sides of the story—it saves his and the other fellow's time. And you know where you stand with Tom Millsop—he doesn't pull his punches.

He's at city hall every day. Debt-free Weirton stays within its budget. Under Tom Millsop's leadership the city has built a fine, new community center and a city water plant. Ground was broken last month for a $3 million hospital.

The door to Tom Millsop's office is always open to Weirton's 13,500 employees. This humble, easy-to-talk-to man is president of radio station WEIR and active in the affairs of the College of Steubenville and West Virginia University.

LEONARD V. BEDELL, named general manager of Sierra Electronic Mfg. Co. and vice-president of Electronic Engineering Associates, Ltd., San Carlos, Calif.

LANCELOT BALDERSON, elected assistant to vice-president in charge of iron ore operations of Oglebay, Norton & Co., Cleveland.

R. HERBERT KNAPP, named chief mining engineer of the coal division of U. S Steel Co., Pittsburgh.

PAUL S. KEMPF, appointed manager of industrial relations for Inland Steel Products Co., Milwaukee.

IRON AGE *introduces*

Continued

A. J. Bedworth, appointed chief assistant to general planning superintendent, Aircraft Div., KAISER-FRAZER CORP., Willow Run, Mich. **F. R. Schroeder** made supervisor of subcontractor planning and scheduling; **W. T. Steils,** supervisor of government furnished property, and **A. L. Mapes,** superintendent of aircraft materials handling.

Lee Harris, appointed director of research and development for NESCO, INC., Chicago.

H. J. Urbach, appointed executive engineer of TIMKEN ROLLER BEARING CO., Canton, Ohio. **C. M. Maratta** named chief consulting engineer; **L. A. Holder,** chief mechanical engineer; and **R. A. Schimpf,** chief works engineer.

William E. Hoard, appointed manager of the Belmont, Calif., plant of WESTERN GEAR WORKS, Seattle. **Ray Conlisk,** promoted to supervisor of Application Engineering Dept. of Pacific Gear and Tool Works.

E. E. Howe, appointed director of research of CHICAGO VITREOUS ENAMEL PRODUCT CO., Cicero, Ill.

W. E. Vaughn, made assistant general manager of sales for the AMERICAN CAN CO., New York.

John C. Wallace, appointed chief engineer for the Diesel Engine Parts Research and Development Div. of HUNT-SPILLER MFG. CORP., Boston.

George J. Goepfert, appointed director of research for SPEER CARBON CO. and INTERNATIONAL GRAPHITE & ELECTRODE CORP., St. Marys, Pa.

Robert B. Haley, named Kansas City zone manager for Pontiac Motor Div. of GENERAL MOTORS CORP., Pontiac, Mich., succeeding Stuart Reeder, who resigned to enter private business.

Curtis M. Clark, appointed counsel for the NORTON CO., Worcester. **Russell E. Starbard,** becomes a buyer in the Purchasing Dept., replacing Robert F. Kirkpatrick, called into service in the Army Air Force.

W. H. Brandt, appointed manager and **S. W. Herwald,** engineering manager of Special Products Development Div. of WESTINGHOUSE ELECTRIC CORP., Pittsburgh. **S. C. Palmer,** named manager of Transportation Sales Dept., succeeding **J. A. Schoch,** made consulting engineer for Transportation and Generator Div.

Richard J. Bakewell, elected sales representative for the Philadelphia district of the Spang-Chalfant Div. of NATIONAL SUPPLY CO., Pittsburgh.

G. H. Campbell, named manager of Newark, N. J., office of GENERAL ELECTRIC CO., Schenectady, succeeding A. W. Lunn, who has retired. **John T. Holleran,** appointed manager of the Fort Edward and Hudson Falls operations of Transformer and Allied Product Divs.

Nicholas Kay, made assistant manager of the Production Dept., Metal Products Div. of KOPPERS CO., INC., Pittsburgh. **Thurman F. Naylor,** appointed manager of the Contracting Dept., Metal Products Div.

Edward N. Case, elected product supervisor for metal trades product sales in the Synthetic Organic Chemicals Dept., Industrial Chemicals Div. of AMERICAN CYANAMID CO., New York.

S. J. Mergenhagen, promoted to sales manager of the Forged Products Div. of AMERICAN FORGE & MFG. CO., Pittsburgh.

William Porter Sullivan, appointed district manager, Wisconsin area for the CAINE STEEL CO.

C. W. Powell, appointed Pittsburgh branch manager for CARBOLOY CO., INC., Detroit.

L. F. Manneschmidt, made manager of the Used Trailer Dept. of the TRAILMOBILE CO., Cincinnati.

Charles H. Weber, Jr., named sales engineer for the New England states by ALLIED METAL SPECIALTIES, INC., Baltimore.

Kirk C. Mattson, joined PENNSYLVANIA SALT MFG. CO., as district sales manager of the company's Los Angeles office.

Larry P. English, appointed chief engineer of K S M PRODUCTS, INC., Merchantville, N. J.

BALL bearings are necessarily made to close tolerances which apply not only to the balls and races but also to the retainers which must have exact dimensions and shapes. This matter of retainer quality has been given careful study by the Stephens-Adamson Mfg. Co., Aurora, Illinois, maker of the well-known SealMaster Industrial ball bearing units. The company collaborated closely with the Revere Technical Advisory Service in working out the specifications and forming procedures for its brass retaining rings. As a part of this joint activity, Revere made a full survey of Stephens-Adamson requirements, with the object of standardizing and simplifying specifications for the benefit of both the engineering and the purchasing departments. The success of this work is indicated by this statement from the Superintendent of SealMaster bearing production: "First and foremost, I am pleased with the uniformity of gauge and temper of the Revere brass we have been receiving. This uniformity makes it possible to produce ball retainers of very close tolerance, with a minimum of rejections and at comparatively low unit cost. Furthermore, I have appreciated the dependable delivery service and the cooperation of the Revere organization."

In these times of scarcities, when it is more than ever necessary to reduce waste and save metal, you may wish to take advantage of Revere's skill and know-how in non-ferrous metals. Just get in touch with the nearest Revere Sales Office.

ABOVE, the largest retainer made for a SealMaster industrial ball bearing unit, contrasted with the smallest block and retainer.

BELOW, three of the steps in retainer production: blanked, formed and punched, and assembled part ready to receive the balls.

REVERE 150th YEAR OF SERVICE TO AMERICA

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere.

SEE "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

on the assembly line

automotive news and opinions

Few major body changes predicted . . . Army using kits to provide versatility . . . TV used by Detroit Edison to present report

by Walter G. Patton

May Postpone Changes — The new model picture changes almost daily. However, latest indications continue to point strongly to a general postponement of scheduled introductions of new body styles.

Original plans of the industry called for extensive body changes in '52. The GM "A" body was set to be replaced. Chrysler also had extensive changes planned, according to the trade. Most of the independents were also scheduled to bring out new models.

Defense Changes Picture—With the threatened shortage of materials, the need for defense tooling, and a government lid on prices, however, the picture has changed significantly. It can be predicted that unless present conditions change radically between now and the end of the year, there will be comparatively few *major* body changes in 1952 cars.

Latest information indicates that neither GM or Chrysler will go through with the major body programs originally planned. There are reports the Ford program has been set back several months. It is indicated Hudson and Studebaker will continue their present models. While the final decisions will be made during the last quarter, this is the present picture.

Use TV for Report—The Detroit Edison Co. scored an industrial first recently when the company used TV to report to its employees, customers and investors. The program, aimed primarily at employees and their families, featured a film-illustrated report of the company's activities and discussed future expansion plans.

President James W. Parker and Chairman of the Board Prentiss M. Brown conducted the meeting. Others participating in the program included Chief Engineer of Power Plants, George Porter, and Edison power plant superintendents.

Industry Feels Price Squeeze—While price controls present a problem to all industrial producers, a firm which is expanding its volume is able to get by reasonably well. A producer whose volume is decreasing finds himself in trouble almost immediately.

Until some method is worked out in Washington whereby the sting is somewhat removed for a business which is contracting, controls will continue to present a serious problem. Right now, facing a period of diminishing volume, the auto industry is feeling the squeeze. A great deal more will be heard on this subject.

Ideal Military Vehicle—Lessons learned on the proving ground and in Korea indicate that much work remains to be done before an ideal military vehicle can be produced in quantity.

Here are some operating features that may eventually go into military transport: (1) locking or semi-locking differentials, (2) completely sealed braking system, (3) a suspension system, possibly a torsion bar, giving increased road clearance, (4) extremely large and soft tires, (5) standard powerplant, (6) a torque converter or automatic transmission.

Maintenance Ease—As Col. William A. Call, Chief, Development and Engineering Dept., Ordnance Tank-Automotive Center, told automotive engineers at French Lick last week, ease of maintenance has been given much attention by Army engineers.

In an operation test held in Texas, mechanics were able to pull the complete powerplant of an M-34 2½-ton truck in 18 min. In combat, this means vehicles could be fully serviced with the replacement power unit and be back in service in less than an hour. The faulty power package would then be repaired in a shop.

Inadequate Suspension — Ordnance is also testing such features as fuel injection and front and intermediate wheel steering in a 5-ton vehicle. The greatest weakness of U. S. built heavy vehicles used in Korea has been inadequate suspension.

assembly line

Continued

It has been estimated that 90 pct of the vehicle losses taking place in the Korean theater have been due solely to spring failures. With the fighting forces see-sawing back and forth, many vehicles with broken springs had to be left behind and destroyed before being abandoned.

Kits Developed—To provide versatility and cut cost of Ordnance vehicles, various kits are being provided. Some of these, for deep-water fording, consist of intake and exhaust stacks. This enables the vehicle to negotiate streams up to the depth of the driver's neck.

Three arctic kits are being built up. One is the hard-top cab, which replaces the standard canvas top. A personnel heater kit is designed to furnish warmth and defrosting of —65°F. A powerplant heater kit provides standby heat in extremely cold weather.

In addition, there are kits of arctic enclosures for cargo bodies consisting largely of quilted, fiberglass tarpaulins, insulated floors and personnel heaters. There are a number of radio kits, consisting of combinations of transmitters and receivers.

Converts to Wrecker—There is an A-frame kit to permit a cargo body vehicle, when it is winch-equipped, to be converted into a wrecker or lifting vehicle. If the vehicle is to be used for towing guns or trailers, there is an electric brake kit which must be mounted on the vehicle prior to using it as a prime mover.

All vehicles must be able to take gun mounts to permit engagement in anti-aircraft fire or fire against ground targets. There is an armored cab kit which replaces the standard cab. There is an additional kit which provides protection to personnel against land mines.

V-8 Economics—The economics of V-8 engines for passenger cars is an involved equation. As brought out by Studebaker engineers at the recent French Lick meeting of SAE, Studebaker's aim was to increase sales and profits by replacing a 6-cylinder engine with an 8-cylinder engine which would cost less and yet have equal or better performance.

To obtain lower cost, the engineers relied upon a chain reaction —a reduction in the length of the engine—to make possible a reduction in the length of the car—which would make possible a reduction in overall weight. Design also took advantage of the latest machining methods of efficient metal processing.

The Studebaker engine finally selected had a 5 pct less displacement than the 6-cylinder engine it replaced. The car weighed about 6 pct *less* than its predecessor and performance was consistently superior over most of the speed range of the 6-cylinder engine formerly used.

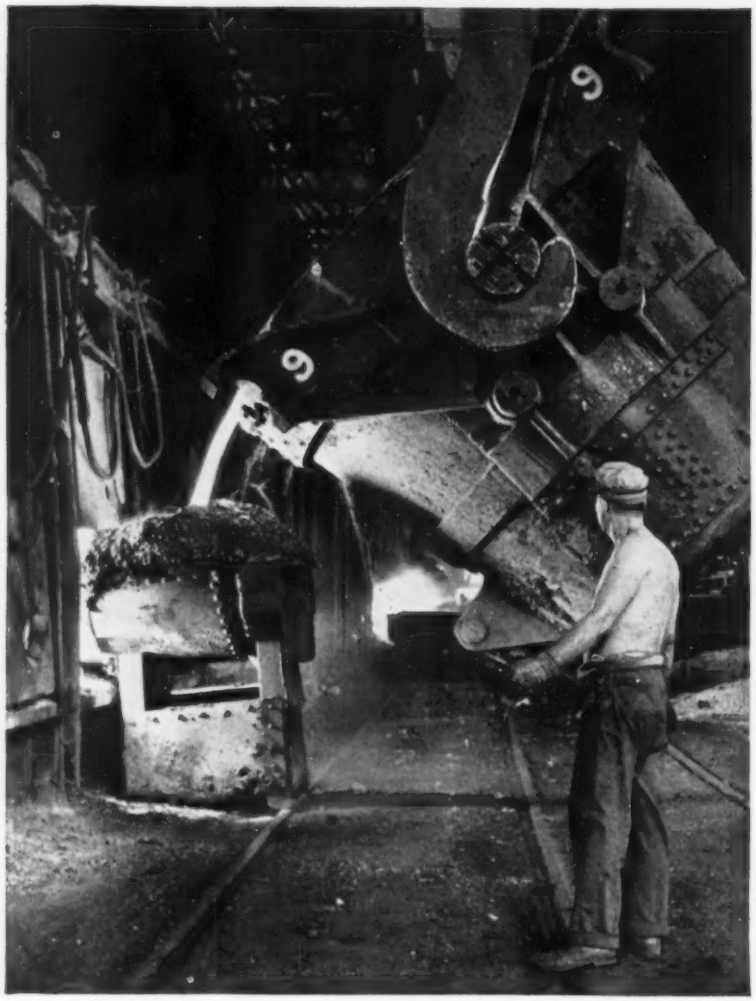
Engine Deposit Studies—Engine deposits have been a subject of intensive study by the automotive industry for years. Investigators for Standard Oil Co., Indiana, reporting at French Lick to the SAE, point out that the quantity of deposits and the rate at which these deposits accumulate in the combustion chamber depend primarily upon the quantity of tetraethyl-lead gasoline, combustion chamber design and engine operating conditions.

Maximum accumulation of engine deposits occurs during city driving. Greatest freedom from deposits is obtained by high speed operation. It is relatively simple to purge a substantial portion of the combustion-chamber deposits accumulated during light-load service by a period of sustained high speed operation.

There is evidence to show that the new Chrysler V-8 engines are less susceptible to combustion chamber deposits than other powerplants. Drinkard has reported power losses of the order of 2 pct and octane-requirement increases amounting to about five units on these engines. These effects are less than half as great as the results reported by Standard Oil Co. researchers on earlier engine designs.

THE BULL OF THE WOODS **By J. R. Williams**

STRAIGHT TALK FROM A STEELMAKER



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The pressure of defense demands may not permit us to serve you the way we try to in normal times. We feel sure you will understand.

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WISCONSIN STEEL

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Harvey Not Out—Contrary to rumors circulating in the Pacific Northwest, Leo Harvey, president of Harvey Machine Co. of Torrance, Calif., last week told THE IRON AGE his company was definitely proceeding with construction of an aluminum reduction works at Kalispell, Mont. Talk was that high construction costs had dampened Harvey's plans.

Apparently Apex Smelting Co. has dropped plans for a reduction plant in the Northwest while Independent Aluminum Co. is still negotiating for a site. Kaiser Aluminum & Chemical Corp. is hoping to get enough interruptible power for an eight pot line at Mead, Wash.

Aluminum Co. of America is putting in additional facilities to make carbon electrodes at its Vancouver, Wash. plant.

Oil Needs Steel—If oil consuming industries demand that the petroleum industry meet the government request for an increase in production of 1 million barrels per day, steel producers may become an innocent whipping boy.

Wilfred H. Geis, consulting geologist and engineer and a director of Oceanic Oil Co., said allocations of steel were at least one-third too low to permit developing enough wells to produce the million barrels a day.

He contended only enough steel is being allocated to maintain present production at the rate of about 40,000 new wells a year and at least 57,000 would have to be drilled to meet demands.

Drill Pipe Problem—Principal handicap in developing needed new wells has been said to be the shortage of drill pipe. Large tonnages of this heavy wall tubing are abraded away in drilling operations and many companies have claimed to be unable to do exploratory drilling because of its scarcity.

In the Kern County area a spot check revealed that some drillers found this shortage the least of their worries. A proposal has just been made by Earl B. Gilmore to build a $40 million refinery in West Texas and a transmission line to bring petroleum products into California to supply industry.

Marking Time — Expected defense work throughout the West continues to be conspicuous by its absence.

In southern California with its heavy industrialization it is estimated by competent observers that only 8 pct of that area's total production is in any way connected with the defense program. Airframe producers are expected to complete tooling and open the flood gates for all-out hiring and production late this year, but in the meantime are only getting set.

Exception to Rule—An exception to the general picture is the Norris Thermador Corp. in Los Angeles which is adding two complete production lines for shell cases with which it hopes to meet demands of a $46 million backlog. Cartridge cases under production range from 20 mm to 8-in. Brass will be used in the 20 and 120 mm and 8-in. and other sizes will be cold drawn from steel. Full operation of the new lines is expected early next month with a 30 pct increase in employment.

Norris conferred last week with Army officers on plans for production of cartidges at the Riverbank, Calif. plant which in the last war produced aluminum. The government is supplying the machinery.

To Build Minesweepers—Six of the smaller Pacific Northwest shipyards will participate in a $50 million program building 70 minesweepers for the Navy. Construction will be largely of wood, but there should be some additional work for steel fabricators and foundries. Activation of these yards will have another impact on the already tight manpower situation in the Seattle area.

Korean Scrap Metal — West Coast scrap dealers are showing interest in the offering of the South Korean government of more than 100,000 tons of war scrap f.o.b. Pusan beachhead. Another 400,000 tons is said to be available on mandated islands.

the federal view

this week in washington

by George H. Baker

Relax Contract Secrecy—Munitions Board is making an about-face, and will partially lift the veil of secrecy surrounding contract awards. Last February, the board directed omission of quantities and dollar values in the Commerce Dept. synopses of defense contracts.

Henceforth, publication of both quantities and dollar values of unclassified negotiated and advertised contracts between $25,000 and $250,000 is to be permitted. Board Chairman says this action is necessary in the interest of small business.

Quantities—and in some cases, dollar values except in general terms such as "more than"—still will be deleted with respect to contracts exceeding $250,000. This is on the theory that such contracts are usually too large for small firms which would have to go to the prime contractor for subcontracts anyway.

GSA Out of Line?—Inclination of Jess Larson, GSA chief, to shy away from subcontracting is stirring up discontent at the Capitol.

Larson recently wrote Rep. Horan, R., Wash., that subcontracting "naturally pyramids the overall cost of the project by adding subcontractors' overhead and profit." His letter was a reply to Horan's protest at the lack of subcontracting at the Electro-Metallurgical Co. plant at Spokane.

Senate Small Business Committee takes the position that Larson's statement is "definitely out of line" with other government promises of doing all it can to "broaden" the base of procurement.

License Ruckus Stirred—President Truman's request for legislation to license business and industry with the intent of revoking such licenses for price violation is stirring up much more controversy on Capitol Hill than the White House had anticipated.

OPS, well aware of this Congressional opposition, is hastening to explain that there's nothing new about the licensing proposal.

Precedent's Been Set—Government planners point out that the Federal Reserve Board already has this power in connection with installment-buying and real-estate credit regulations. And, OPA also had licensing power but exercised it "sparingly and judiciously," they cite as precedents.

Congress takes a dim view of the new request for licensing authority. Proposals to grant Federal licenses to corporations have been voted down every year for the past 20 years.

Luxury Ship Subsidies—Is the government justified in subsidizing construction of six new luxury liners to the tune of $80 million?

A House subcommittee thinks the answer is "no." Point is made that Congress intends maritime subsidies to be used primarily to promote an efficient, up-to-date merchant fleet.

Federal Maritime Board argues that shipping lines will probably refuse to take delivery of the luxury vessels now under construction if Congress orders cuts in the subsidies authorized by the now-defunct Maritime Commission.

Satellite Boycott—Ban on shipments of any of some 1700 broad categories of goods to nations included in the Soviet bloc is now official.

Administrator Foster of ECA has acknowledged receipt from Defense Secretary Marshall of the certified lists of individual items.

This control was voted by Congress over President Truman's objections that it was both "defective" and "difficult" to administer. Nevertheless, if other nations fail to take similar action ECA and other economic aid may be shut off.

Tax Bill Moves Slowly—Current hassle over size and form of the new tax bill means that at least several more months will pass before the legislation is signed into law.

Corporations are due to be tapped for another $2,080,000,000. Excises would be raised by $1 billion by new and added levies on such products as gasoline, liquor, tobacco, and automobiles.

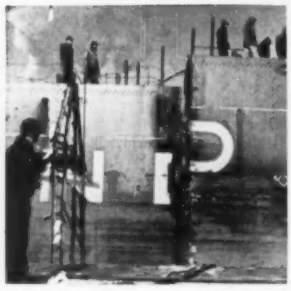
STRETCHING

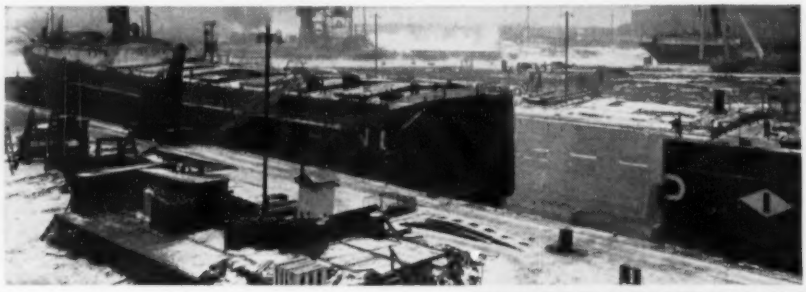
a ship stretches steel supply . . .

Inland boosts ore carrying capacity by adding 72 feet to the *Philip D. Block*

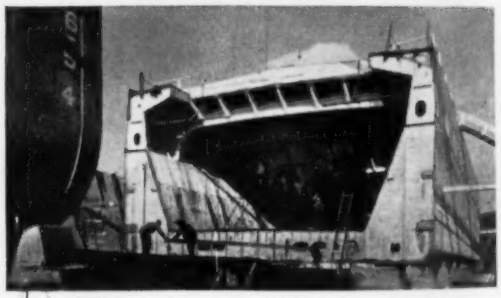
40,000 more tons of much-needed ore is made available to Inland Blast Furnaces each year.

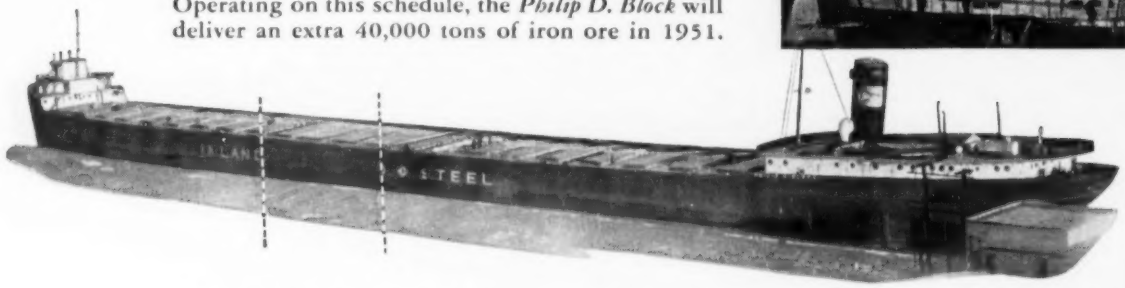
1 A "before" photo of the *Philip D. Block* showing where ship is to be cut in half. This ship, built in 1925 had an overall hull length of 600 ft. Lengthening will bring the *Block* to within 6 ft. of the new *Wilfred Sykes,* Inland's flagship and largest vessel on the Great Lakes.





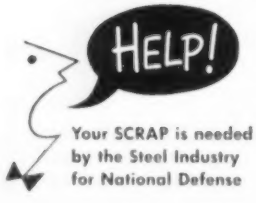
2 Ship has been opened amidships, floated apart and is ready to receive new 72 ft. midsection. Addition of this section will give the ship an average carrying capacity in excess of 14,000 gross tons. Previous average tonnage was 12,800. In a normal lake shipping season, this vessel will make 33 complete round trips between the ore docks at Superior, Wisconsin, and Inland's mill at Indiana Harbor. Operating on this schedule, the *Philip D. Block* will deliver an extra 40,000 tons of iron ore in 1951.





3 New mid-section is in place and reconstruction complete. Total time in drydock: 100 days. The *Philip D. Block* has since joined her four sister ships, and the many other lake ore carriers, in the important task of supplying iron ore to a nation counting more than ever on a big year in steel.

The lengthening of the *Philip D. Block* is just one more step in a continuing modernization and expansion program at Inland.



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INLAND

THE IRON AGE
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TECHNICAL ARTICLES

HOW TITANIUM BEHAVES

AT TEMPERATURES TO 900°F

by
W. Lee Williams
Head, Physical Metallurgy Branch
Metallurgical Laboratory
U. S. Naval Engineering Experiment Station
Annapolis, Md.

Light weight and erosion resistance make titanium a natural for steam turbine blades. Although the best properties will be found in titanium base alloys, this study shows how commercially pure titanium can be expected to behave at temperatures to 900°F.

Titanium and its alloys have useful properties at temperatures between those suitable for aluminum alloys and ferritic steels. Of particular interest are the properties at temperatures common to modern steam power turbines. Its light weight makes it attractive for rotating parts, and the high erosion resistance to wet steam makes titanium a natural for turbine blades. Yet in spite of these attractions, very few data have been published regarding its elevated temperature properties. The best high temperature properties are obtained with the titanium base alloys. However, a study of the "unalloyed" product is useful to provide a basis for alloy evaluation.

Induction compared with arc melting

The tests were made on two commercial ingots. One of these was a 77-lb ingot produced by induction melting in graphite. The other was produced as a 35-lb ingot arc melted in graphite. Pertinent details are given in Table I. The broad range of carbon content reflected the inhomogeneity often found with the arc melted materials. Both ingots were sectioned for two finishing treatments: Hot forge-anneal, and hot forge-cold work. However, cold working of the induction melted ingot was not successful; internal bursts formed at all working temperatures up to 1400°F.

The tensile properties up to 900°F are shown in Fig. 1. Each plotted point represented an average of two or more determinations. The individual specimens were completely randomized before testing. This was done to bring out the effects of inhomogeneities which were expected to result from the melting techniques employed. Under these conditions, it was not surprising that some of the average property curves took some peculiar twists, or that some of the plotted points did not fall on the smoothed-in diagrams.

Nitrogen contents are similar

All of the materials showed a leveling off of the strength properties within the range of 500° to 800°F. This is a characteristic of titanium. The reason is not clear. It probably can be ascribed to the taking into solution with increasing temperature of some constituent, possibly carbon. The induction melted and arc melted annealed materials, IA and AA, had similar strength properties despite their difference in carbon content. This observation fell in line with the conclusion of Gee[1] that carbon in this range has little effect on the tensile strength. Nitrogen is known to have an appreciable effect on the ultimate strength at room temperature. However, the difference in nitrogen content of materials IA and AA was not great enough to be felt.

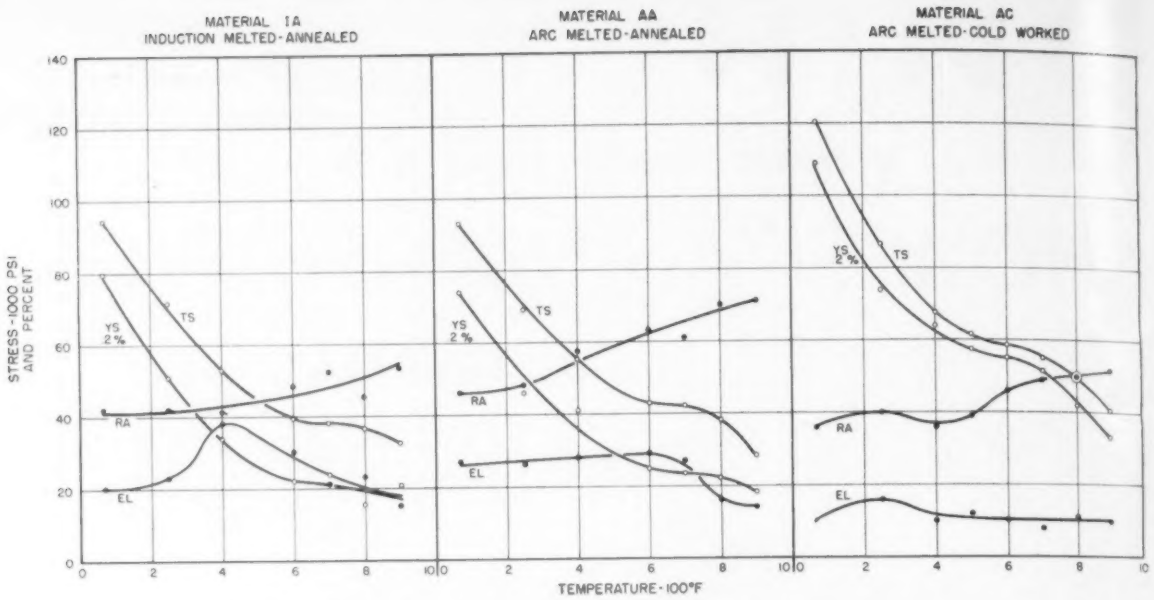


FIG. 1—The tensile properties of titanium as a function of temperature.

Titanium (Continued)

A comparison of the annealed and cold-rolled arc-melted titanium, AA and AC, was of interest. The yield ratio, as well as the yield strength and tensile strength, was increased by cold working. The superior properties of the cold rolled product were maintained up to 900°F in the short time tensile tests. One would not expect this superiority to be maintained so noticeably in long time tests, especially at the higher temperatures. The reason is evident from Fig. 2, which has been reproduced from a Remington Arms publication.[2] The diagram shows that at the higher temperatures there is a fairly rapid removal of the effects of cold work. More will be said about this later with the presentation of the creep and stress-rupture properties.

Elastic modulus values vary

Published values for the elastic modulus in tension have been noticeably erratic. This has been attributed to either variations in the material or laxities in experimental testing.[3] The data shown in Fig. 3 lead one to believe that material variations are the predominant cause. Each of the curves shown was determined from exceptionally careful measurements on a single specimen, so that variations between specimens would be eliminated. The procedure was to measure the modulus first at room temperature and then at successively higher temperatures. Despite all this caution, some differences and scatter were observed.

Similar modulus measurements have been made on titanium materials other than those shown in Fig. 3. Rather marked and reproducible discontinuities were noted occasionally in the modulus-temperature curves, especially in the range of 500° to 900°F. In some cases a detectable change occurred in the room temperature modulus after heating in this range. One is led to suspect that subtle structural changes take place at the intermediate temperatures.

The composition, structure and method of working all have an effect on the elastic modulus, and appreciable differences from one lot of material to another can be expected. These differences are difficult to predict, and considerable

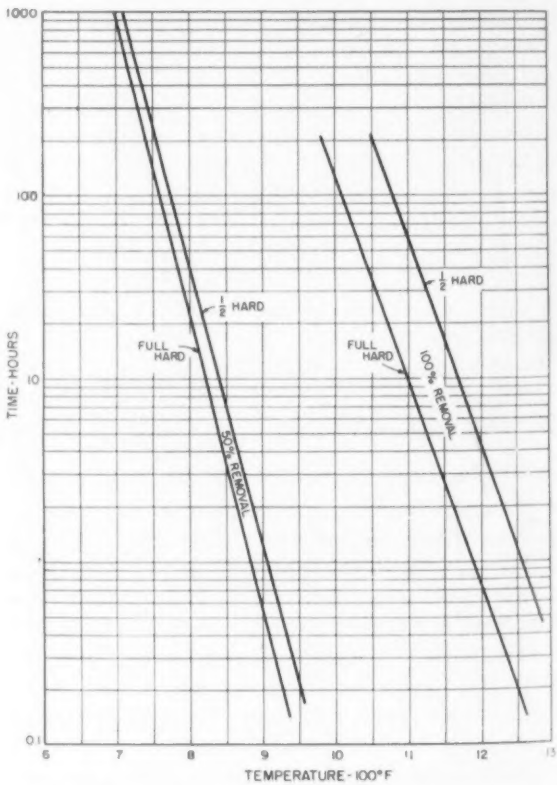


FIG. 2—Effect of time and temperature on the removal of cold work from commercially pure titanium. (Data from Remington Arms Co., Inc.).

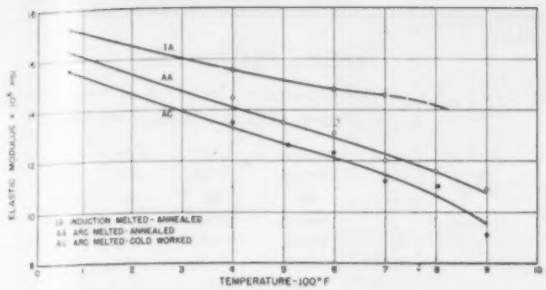


FIG. 3—The elastic modulus of titanium as a function of temperature.

research will have to be done to provide suitable answers to all the problems in connection with the modulus of titanium.

Stress-rupture and creep curves typical of titanium are shown in Figs. 4 and 5. Time-extension measurements were taken during the stress-rupture tests. This enabled the calculation of minimum creep rates for the longer stress-rupture tests, and consequent extension of the creep graphs to regions of higher creep rate. Data so obtained were plotted with solid points in Fig. 5.

Stress rupture strengths plotted

Up to 600° or 700°F the stress-rupture curves were very flat over a long range of rupture life. In other words, the stress-rupture strength was very nearly equal to the short time tensile strength at the corresponding temperature. For example, titanium AA broke on loading to 38,000 psi at 700°F, but the same material endured 510 hr before rupture when loaded to 36,000 psi at 700°F.

The creep data were fairly limited at this writing. However, certain interesting observations are possible with the data in Fig. 5 and Table II. The most important thing was the tendency for the curves to converge at the low rates of creep. The 800°F data showed this particularly well. Since the creep tests were run for a minimum of 2000 hr, it was apparent that the long sojourn at temperature minimized the high strength advantage of the cold worked product.

The data listed in Table III were obtained from room temperature tensile tests of the exposed creep specimens. These data illustrated even more vividly the very definite effects of prolonged heating of the cold-worked titanium, AC.

TABLE I

MATERIALS TESTED

Identifying symbol	IA	AA	AC
Melted in graphite by:	Induction	Arc	Arc
Hot forged, then:	Annealed 1300°F	Annealed 1300°F	Cold rolled 21%
Diam. of finished bar:	1"	5/8"	1/2"
Percent composition			
Carbon	.58	.18 - .46	
Sulfur	.010	.009	
Manganese	.04	.05 - .09	
Silicon	<.002	<.002	
Copper	.001	.002 - .004	
Iron	.13	.11 - .13	
Magnesium	<.01	<.01	
Nitrogen	.022	.001 - .003	
Chlorine	Nil	Nil	
Tungsten	Nil	Nil	
Oxygen	Results not yet available		

TABLE II

CREEP AND STRESS-RUPTURE PROPERTIES

Type of Material	Temp., °F	Stress, psi, for fracture in 100 hr	500 hr	1000 hr	Stress, psi, for min. creep rate, 1 pct in 10000 hr	100000 hr
Induction melted, annealed, IA	600	38000	37000	36000	.....	23000+
	700	33000	32000	29000	25000	.....
	800	24000	19500	17500	13000	9000
Arc melted, annealed, AA	700	37000	36000	35000	.....	.....
	800	25000	16000	13500	.....	.....
Arc melted, cold worked, AC	600	84000	82000	81000	57000	43000
	700	54000	45000	42000	29000	18000
	800	33000	28000	23800	13800	8500
	900	17000	12000	10000	.....	.....

In pulling the specimens after the creep tests, it was found that the variations between duplicate specimens were considerably less than would have been the case for the same material prior to creep exposure. A similar behavior was noted for other lots of titanium. Therefore, it was fairly certain that some subtle form of homogenization or structural change occurred with time at temperatures below 900°F.

The strength properties of titanium, and of the alloys now being produced, do not match those of ferritic steels at the temperatures associated with modern steam power turbines. This is not so much of a disadvantage for rotating parts where the principal stresses result from centrifugal force. For example, the centrifugal force on a steel turbine blade would be about 1.7 times as great as the force on a titanium blade of the same design and operating conditions.

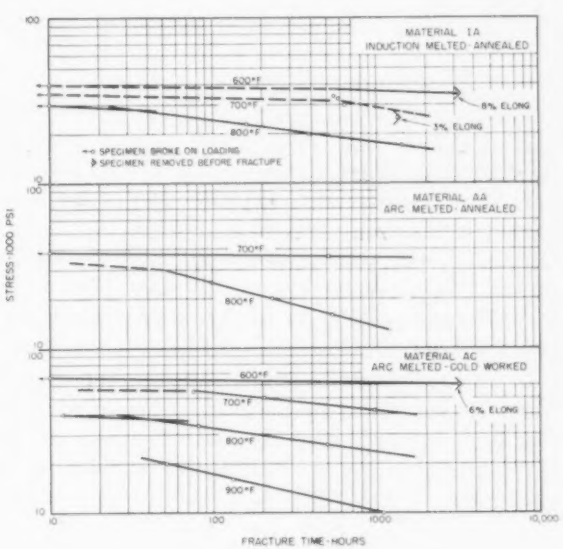


FIG. 4—Stress-rupture graphs for titanium.

It was only natural, then, that interest was focused on titanium for turbine blade applica-

tions. However, for steam turbine service the blade material must be resistant to erosion in high velocity steam. Dry superheated steam is no problem, but wet steam conditions are especially damaging. Fairly good resistance to this type of attack is one of the many reasons for the common use of Type 403 steel for steam turbine blading.

A useful apparatus was devised at the Engineering Experiment Station to compare the steam erosion resistance of various materials. The equipment consisted of an arrangement for directing high pressure steam through a nozzle so as to impinge on the sharp apex of a concave-sided simulated blade section. Several specimens could be run simultaneously, so that comparisons of the materials were possible without precise control of the moisture content of the steam.

TABLE III

TENSILE PROPERTIES

Showing effects of prolonged heating of cold-worked titanium, material AC, during creep tests.

Exposure temp., °F	Exposure time, hr	Tensile strength, psi	Yield at 0.2%, psi	Elong. in 2 in., %	Red. of area, %
Room	....	120400	109100	10	36
600	2136	118300	110400	16	28
700	2028	106300	91400	12	26
800	2016	90600	70800	16	28

of. It seems apparent that mild cold working offers a simple way to improve the properties of some alloys even beyond that gained by heat treatment or alloying per se. For example, certain alloys now are used in the annealed condition. Some of these could be strengthened by mild working without too serious a reduction of ductility. The strength so gained would remain effective over long periods of time except at the highest of useful temperatures.

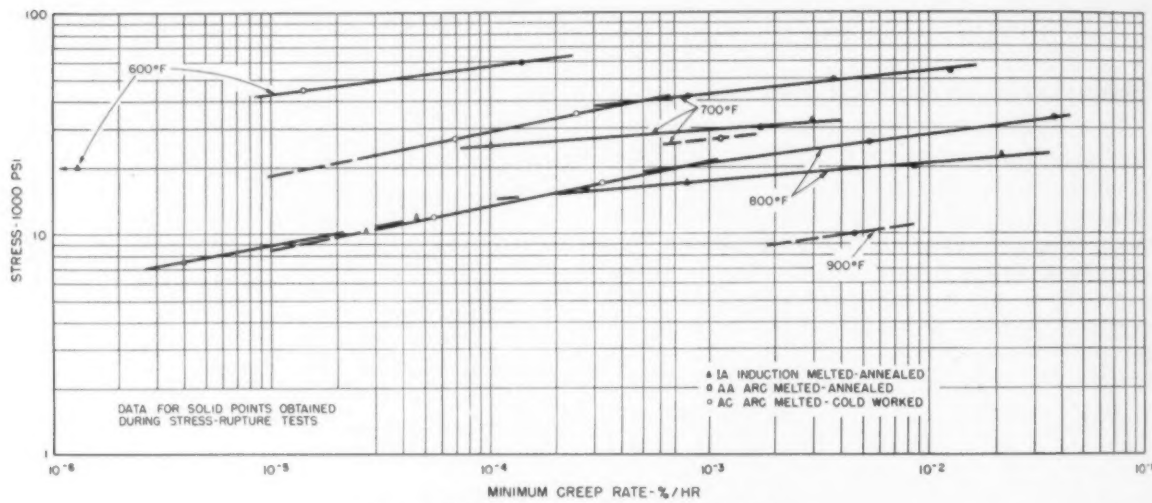


FIG. 5—Minimum creep rate curves for titanium.

Several tests have been made with titanium and titanium base alloys. The results obtained with the specimens shown in Fig. 6 were typical. These specimens were exposed for 45 days to steam taken from a saturated steam line averaging 550 psi gage pressure and 480°F temperature. Weight loss data for the specimens were as follows: Type 403 steel, 0.094 grams; titanium, 0.018 grams.

It is not difficult to predict some of the advantages to be gained by alloying. Quite naturallly one can expect better tensile properties at all temperatures. But it will be the stress-rupture and creep properties, and especially the latter, which should benefit the most. This will be brought about by increased structural stability and resistance to tempering at elevated temperatures.

The tests of the unalloyed metal point to another possibility not yet fully taken advantage

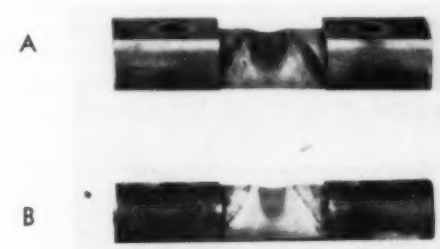


FIG. 6—Wet steam erosion specimens, x 1¼. A—Type 403 steel. B—Unalloyed titanium.

The views expressed above are those of the author, and not necessarily those of the Navy Dept.

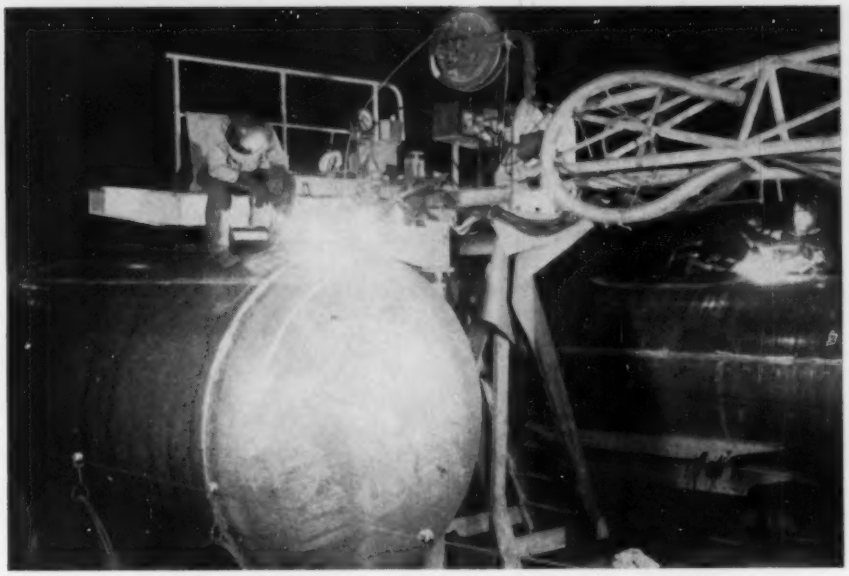
References

[1] *E. A. Gee, J. B. Sutton and W. J. Barth, "Effect of Carbon in Titanium Metal Ingots," Ind. & Engr. Chem., Vol. 42, Feb. 1950, pp. 243-248.*

[2] *Remington Arms Co., Inc., "Technical Information on Titanium Metal."*

[3] *Titanium Metals Corp. of America, "Handbook on Titanium Metal."*

Oxy-argon gas Speeds up welding



SIGMA WELDING being used in a heavy fabrication job.

A new principle said to multiply the speed of inert gas shielded arc welding of stainless and carbon steels has been announced by Linde Air Products Co. Unusual results have been obtained by use of a mixture of oxygen in argon as a shielding atmosphere.

Earlier research had established that, for best welding conditions, metal transfer consists of a series of discrete metal droplets propelled at a high velocity. . Droplet formation will vary with different metals and for different current densities.

Recent investigations by Linde have shown that the droplet rate, particularly on stainless and carbon steels, can be increased as much as 50 times by the addition of small percentages of oxygen to highly purified argon. With no change in current density, this permits welding at higher speeds. Coalescence of the weld metal is improved at increased welding speeds. Overhead welding of stainless steel is made practicable.

Current densities lowered

Or, it permits welding at lower current densities. Thus larger diameter, more economical rods may be used for a given welding current. If the same size rod now available is used, then thinner materials can be welded.

Use of this special argon is expected to expand the application of sigma welding on stainless steel because of improved economy, and ability to perform welding operations not practicable with straight argon. Likewise, on carbon steels, increased applications of sigma welding can be expected as welding speeds can be at least doubled, gas consumption correspondingly reduced, and less expensive welding rod used.

Shielded inert gas metal arc welding, sometimes referred to as sigma welding, has so far in its approximate three years of commercial use been mainly utilized for welding aluminum, in the flat position. With fully automatic equipment, weld quality comparable to that of the non-consumable-electrode shielded arc process is readily obtained.

In sigma welding, a better heat transfer efficiency is obtained than in the Heliarc, or non-consumable electrode type of inert-gas-shielded welding. This is because the added metal is carried over in the molten state in the arc stream, rather than heated from the non-consumable electrode or molten puddle. And, current densities are not limited by the melting temperature of the tungsten electrode. These characteristics result in higher rates of metal deposition, lower costs, and higher weld zone cooling rates. A cost comparison with Heliarc welding is shown in the accompanying table.

While overall cost comparisons must include a number of other factors than direct welding costs, the comparisons in this table are significant in illustrating possible savings. The high duty factor of 70 pct obtained in mechanized sigma welding against the duty factor of 40 pct for Heliarc welding, and the higher rate of deposition with less than half the rod per foot of weld, result in a welding cost for sigma welding of about 1/3 that for Heliarc welding, on flat aluminum.

COST COMPARISON

Costs for 100 ft of ½-in. Aluminum Plate

	Heliarc	Sigma
Welding rate, ipm per pass	10	12
No. of passes	3	2
Duty factor, pct	40	70
Argon used, cu ft	1125	335
Rod used, lb	14	8
Labor at $2 per hr	$30.00	$11.40
Gas cost	112.50	33.50
Rod cost	10.40	4.68
Power and miscellaneous	1.00	.75
	$153.90	$50.33

CO-DEPOSITED STOPOFF CONSERVES TIN

By E. S. Coe
Sr. Chemical Research Engineer
Ford Motor Co.
Dearborn

Pure tin has been used to form a protective barrier against the furnace atmosphere in selective hardening of parts requiring localized case hardening. A co-deposited alloy plating of 5 to 15 pct Sn and 85 to 95 pct Cu makes an effective substitute, greatly reducing tin consumption and is also cheaper.

Tin is vital to the defense economy and contributes to support of the armed services in many ways. Since this metal is not readily available in this country and must be obtained in distant places, every effort must be expended to conserve our dwindling stockpile.

With the tempo of the defense program steadily increasing, it seems desirable at this time to review methods for reducing tin consumption. One method represents the substitution of a co-deposited alloy plating of 5 to 15 pct tin and 85 to 95 pct copper for the pure tin, as a barrier for the ammonia used in case hardening of steel.

In the design of many engine parts, it is desirable to specify a hard, wear-resistant surface on some areas of a part such as the gear teeth, and for other areas, such as the web of gears, a softer, shock-resistant structure without a case. Areas of parts which are to remain soft must have some barrier to prevent gas absorption.

Plated coating used as barrier

A common method is to use an electroplated coating of suitable metal which will form a barrier. This is done by electroplating only specified areas or, more simply, by electroplating the entire piece and then removing the plate from the areas which are to be case-hardened.

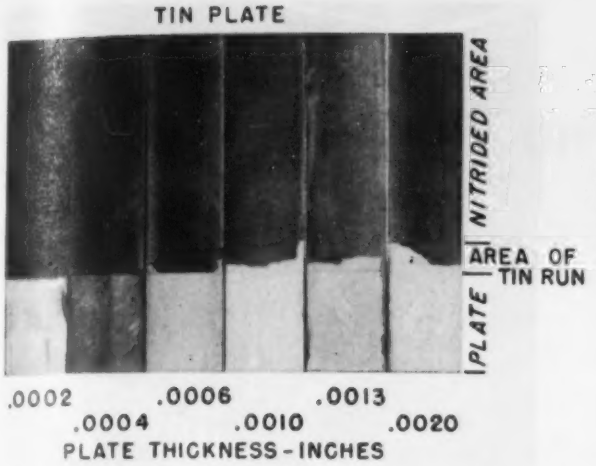
In the past, it has been customary to use tin, usually plated from a sodium stannate bath, as the barrier for nitriding or carbonitriding. Although tin forms a satisfactory barrier and prevents absorption of certain gases at elevated temperatures, it has some disadvantages.

Since tin melts at 450° F and nitriding and carbonitriding are usually carried out at 1000° F and 1350° F respectively, the tin coating will melt at these operating temperatures. With a specification of 0.0003 to 0.0005 in. tin thickness, it is practically impossible to maintain the plating on a production cycle in all areas of a complicated part below 0.0006 in.

If the coating of tin is thicker than 0.0006 in., it will run from the plated areas as shown in Figs. 1 and 2, thus forming a barrier to the gas and causing soft spots. To avoid this difficulty, some operators resort to a hand-sanding operation subsequent to tin plating, to reduce the plate thickness in areas which are plated too heavily.

If the plate is too thin or porous, the gas will leak through and cause hard spots in the steel, resulting in tool breakage and other difficulties. With tin priced in the neighborhood of $1.50 per lb., it is in the interests of good economy to replace it with a cheaper material.

Searching for a more suitable barrier without these disadvantages, it was found that a co-deposited plate of 5 to 15 pct Sn and 85 to 95 pct Cu would form an effective barrier for nitriding gases at 1000° F. In addition, it was seen



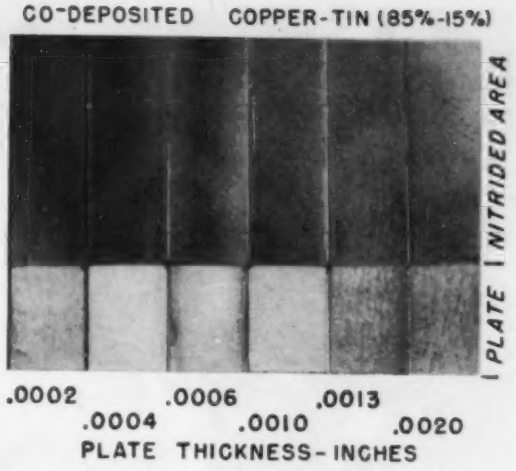


FIG. 1—The group of samples on the left shows how tin run during nitriding at 1000°F varies with plate thickness. In the other group, right, this undesirable run was eliminated by using the co-deposited copper-tin plate; stopoff under the plate in this group was satisfactory in all cases.

FIG. 2—Soft spots (light areas) along edges of the gear teeth resulted from the running of excessive tin during nitriding at 1000°F. The tin ran from the sides of the gear teeth to the areas intended to be hard.

that the increased melting point of the alloy plate, as shown by the copper-tin constitution diagram in Fig. 3, was effective in preventing troublesome running of the stop-off medium, even up

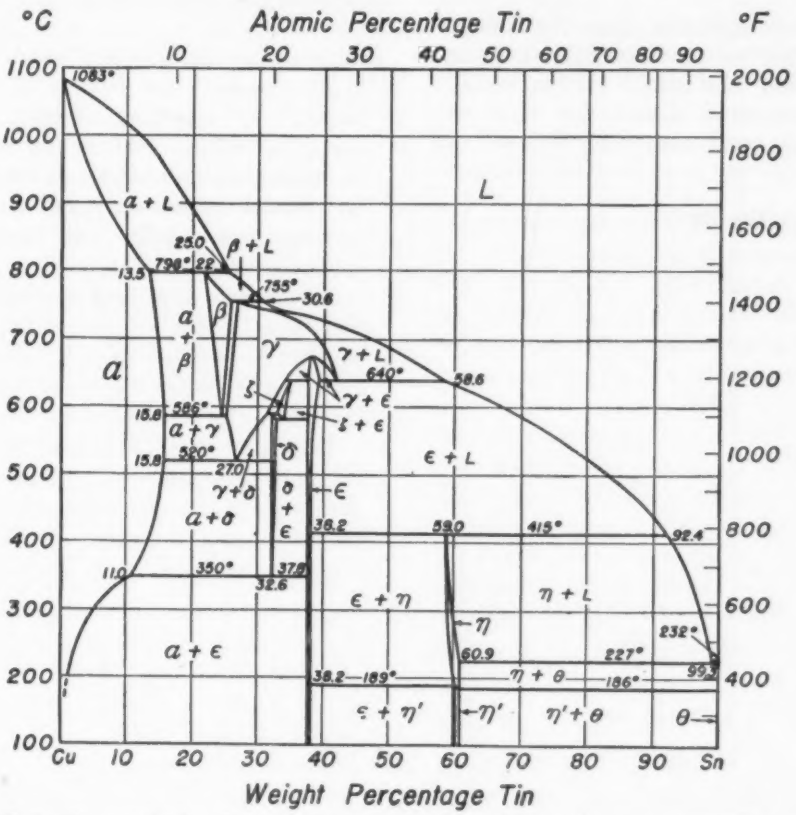


FIG. 3—The constitution diagram of copper-tin shows that, in the area representing an alloy of 5 to 15 pct Sn and a maximum temperature of 1350°F, there is no liquidus and consequently no flowing or running of the plate. From Metals Handbook, ASM.

to 0.0020 in. of plate. This thickness is well above the maximum plate obtained on any part when the minimum plate thickness is maintained at 0.0003 to 0.0005 in. This method also proved effective against carbonitriding at 1350° F.

This method has proven satisfactory in production and is now being used by at least one major aircraft engine company for all nitrided

FIG. 4—Photomicrograph of a typical carbonitrided case, showing the primary and secondary cases. 500X.

Tin Conservation (Continued)

gears and shafts and by the Ford Motor Co. for effective stop-off in carbonitriding replacement sleeves for automotive and tractor engines, see Figs. 4 and 5.

Existing sodium stannate tinplating solution can be easily converted to co-deposit copper and tin. A complicated dual anode system or alloy anodes are not required. Conversion of a stannate bath can be accomplished as follows with no loss in chemicals and no change in equipment:

How To Convert The Bath

(1) *Transfer approx 50 pct of the existing sodium stannate solution to a storage tank. This solution is later used to replace the sodium stannate in the solution as required.*

(2) *Replace the tin anodes with an equal number of copper anodes.*

(3) *Add sodium cyanide, copper cyanide, and caustic soda to bring the final solution up to the following range: Copper as copper cyanide, 4.2 to 5.4 oz per gal; free cyanide, 1.7 to 2.3 oz per gal; caustic soda, 1.2 to 2.0 oz per gal; sodium stannate (draw from storage until exhausted; then add sodium stannate salts for source of tin), 4.5 to 5.5 oz per gal.*

The following plating conditions are satisfactory:

temperature, 100° to 120° F; current density, 5 to 50 amp per sq ft; alloy plate, 5 to 15 pct Sn, balance copper.

The use of hydrogen peroxide is no longer necessary in the copper-tin bath. However, the peroxide present from the original stannate bath causes no difficulty. The formation of carbonates does not seem to affect the plating efficiency of the solution.

If the bath is controlled within these limits,

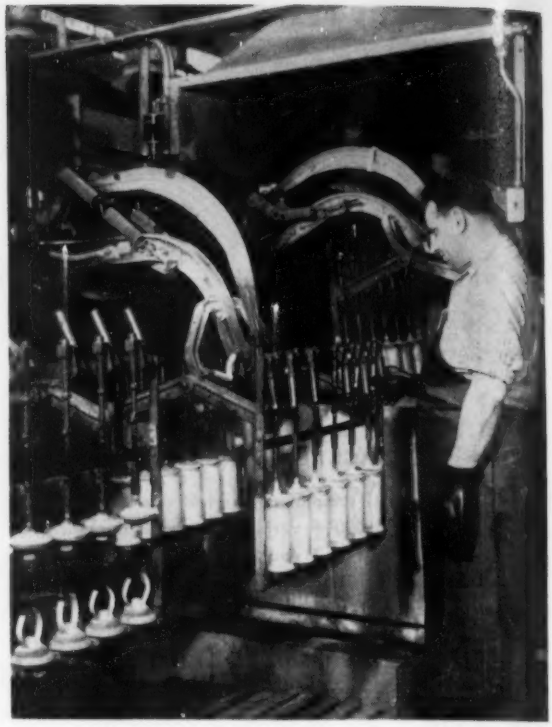


FIG. 5—Unloading station of an automatic plating machine in which cylinder sleeves have been electroplated with co-deposited copper-tin on the outside surface.

the plate will be between 5 and 15 pct Sn, which in thicknesses over 0.0003 in. has been found satisfactory to stop off nitriding and carbonitriding. The plating content can be checked either by spectographic analysis or by plating the alloy on stainless steel, stripping the plate, and analyzing it chemically. The characteristic golden color also aids in maintaining the proper alloy.

An increase in temperature of the plating bath increases the tin content of the plate, as shown in Fig. 6. An increase in current density decreases the tin in the plate, which the color of the plating at various densities confirms.

This method of co-depositing copper and tin not only eliminates soft spots on nitrided parts due to plate run and releases more tin for critical uses, but also reduces the cost of the plating chemicals and anodes by at least 50 pct.

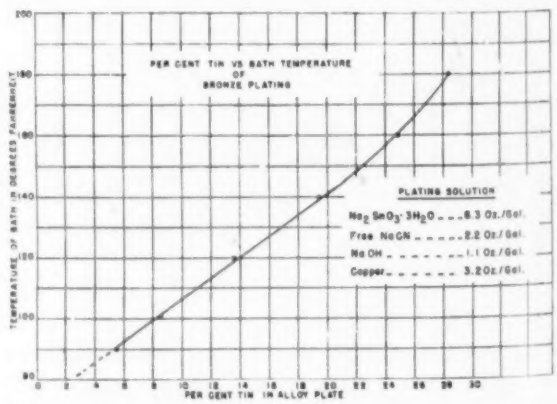


FIG. 6—Chart showing how an increase in temperature increases the tin content of the plate.

70 Million castings in 243 DAYS

By William Czygan
Associate Editor

Efficient handling and extensive mechanization enable the Eaton permanent mold foundry to produce a huge number of gray iron castings. Special skips facilitate carrying and dumping of lift truck loads, and hopperizing plays an important part in handling the variety of castings made.

An excellent example of how the ancient art of iron founding can be brought up to modern standards of efficiency and productivity is the Foundry Div. of the Eaton Mfg. Co., Vassar, Mich. By combining improved materials handling techniques with a high degree of mechanization, approximately 550 employees at this permanent mold foundry produced more than 70 million gray iron castings last year in 243 working days.

Materials handling plays an important role in the impressive Eaton production records, since the castings must be moved and handled about 17 times after actual pouring. The problems of separation and transport around a plant are considerable enough when output approaches 300,000 castings per day; they become even more acute where, as in this case, something like 1200 different types of castings are being produced with around 70 to 90 different parts daily.

Produce Wide Variety of Castings

Castings made at the Vassar foundry vary from ¼ to 15 lb with an average of about 1 lb per individual casting, and cover a broad range from the simplest shapes to fairly complex cored types. About 40 pct of the output goes to the automotive industry, around 30 pct is for air-conditioning and refrigeration components, and the remaining 30 pct for the appliance field such as washing machines, ironers and other items. The plant has grown from a 40x80-ft shop employing 27 workers in 1920 to the enviable position of the world's largest permanent mold gray iron foundry, employing almost one-fourth the population of Vassar, Mich.

The improved procedures begin with raw materials received at the plant. Railroad cars are unloaded by a magnetic crane, which also lifts the scrap and pig iron to the weigh hopper. The 4000-lb charge is then emptied into a skip bucket and charged into the cupola stack by way of mechanical charging apparatus.

By means of a pivoting arrangement, the charger can be swung to service the charging door of either of the three cupolas. Only one of the 54-in. cupolas is kept in operation at a time, melting about 275 tons of gray iron per 16-hr operation. Another is kept on standby while the third cupola is being relined with a Bondactor lining gun (see THE IRON AGE, May 4, 1950, p. 94).

Use Continuous Tap System

A continuous tapping system runs the molten iron into a barrel-type receiving ladle. The iron is then transferred to 1200-lb bull ladles operating on an overhead monorail to the eighteen permanent mold machines. Front slagging is used where a cold stream of water shatters the slag into finely divided particles. The pulverized slag washes into a skip at the rear of the cupola for easy disposal.

The Eaton permanent mold machine is essentially an actuating mechanism that opens and closes the molds. Each machine carries twelve molds, which continually rotate around a central hub. As the machine revolves, cam-controlled valves actuate the arms attached to the inner half of the permanent molds, opening and closing them at pre-set intervals.

Two operators are required on each machine, one for pouring the metal and the other for removing the castings. When cored castings are being run, a third man sets the cores just before the molds are closed preparatory to pouring.

When the iron molds are fabricated they are heated to 400° and receive a patented refractory coating in the casting cavity and on the mold face. This special coating prevents direct contact of the molten metal with the mold surface, which aids in greatly extending mold life

and facilitates extracting the castings from the mold.

A ladle suspended from an overhead tramrail is used for pouring after which the mold continues to rotate through a short solidification period. Near the end of the solidifying time, the mold automatically opens and the gate of castings is hooked out.

In the next stage of the cycle the open mold travels under a hood, where it receives a coating of soot from an acetylene flame. The purpose of this smoke coating is to minimize any tendency for the casting to stick to the mold. Finally, the inner head of the machine moves forward, closing the mold in readiness for another cycle. The complete cycle takes anywhere from 2 to 6 min, depending upon the mass of metal for proper solidification.

As the castings are hooked out of the mold, they are tossed into skips for transport to a cooling slab outdoors. These skips are another innovation specially designed for greater ease of handling. The corrugated steel boxes, reinforced at the corners with angle irons, measure about 3x3x4 ft and have a slanted front for controlled dumping.

Trunnions attached to each side of the skip fit into notches on the two arms of the fork lift trucks, as shown in Fig. 1. The rear notches hold the box steady for carrying. For dumping, the skip is first placed on the corner of a hopper or on the floor, and the operator shifts it to the front set of notches. Then when the load is raised, the skip tilts forward and empties out.

Castings, after being cooled outdoors from the molding machines, are dumped in this manner into a continuous tumbling mill, which discharges onto a sorting belt as shown in Fig. 2. Sorters stationed along the moving belt segregate the castings from among the broken gates and risers, tossing them into individual skips lined up in front of the belt. Lift trucks are again used to transport the skips to the annealing furnaces.

FIG. 1—Slots in the arms of the fork lift truck engage trunnions fixed to each side of the metal skip, shown here at the discharge end of the cleaning machine.

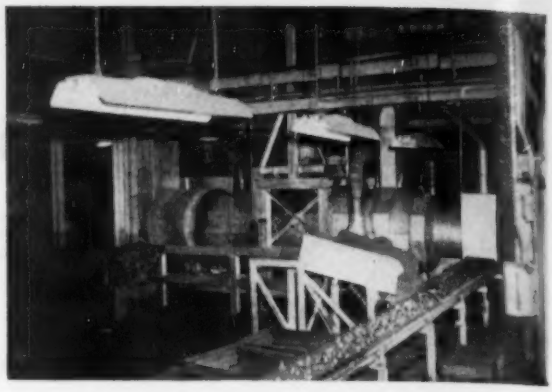


FIG. 2—Tumbling barrel, background, discharges onto the moving sorting belt, where pickers select the castings and toss them into individual skips in front of the belt.

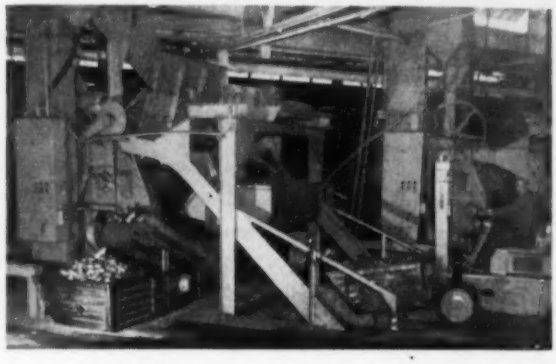


FIG. 3—Mechanical conveyer belts discharge cleaned castings from the shot-blasting units into skips for speedy transfer to the snagging line.

All castings produced at the Vassar foundry are annealed to remove any possible casting strains, improve machinability and enhance the physical properties. The six oil or gas fired, tunnel type pusher furnaces are held at temperatures of from 1600° to 1700° F; the entire annealing cycle takes about 3½ hr. On the discharge end, the castings are dumped into skips for cooling and then delivered to the cleaning department.

The skips are raised by the lift trucks and emptied into elevated hoppers in front of the shot-blasting units. Measured loads from the hopper drop into the machines for the cleaning operation, after which the castings again are discharged into skips by mechanical conveyer belts as in Fig. 3, which catch the castings as they are dumped out of the machine.

Hopperizing also plays an important part on the snagging line, where the small projections

left from the gates and risers are ground off. Lift trucks empty the skips from the cleaning room into individual hoppers next to each grinder. The castings are delivered through a waist-level chute within easy reach of the operator, as shown in Fig. 4, saving the time ordinarily required for stooping to pick the castings out of a tote box and greatly reducing operator fatigue. The castings are tossed into skips after the snagging operation and then taken to the inspection benches.

In some cases, production jobs require special grinding operations. One such large volume casting is a valve guide bushing for the automotive industry, measuring 3/8 in. in diam and about 2 3/4 in. in length. These are also first dumped into a hopper, after which an automatic positioning device feeds them into a special double spindle disk grinder for end grinding to length. Discharge is again onto conveyer belts and into skips.

Castings requiring centerless grinding are automatically fed through tandem set-ups and are discharged into skips. Tolerances of plus or minus 0.002 in. are held on both length and diameter.

After careful inspection from hoppers again, the finished castings are weighed, oiled if necessary to customers' specifications and then bagged for shipment. Here again, efficient handling and bagging systems pay dividends in creating a smooth flow of the finished product and reducing man-hours. The bags are wired shut and placed on flats, then loaded directly onto railway cars or highway carriers by lift trucks.

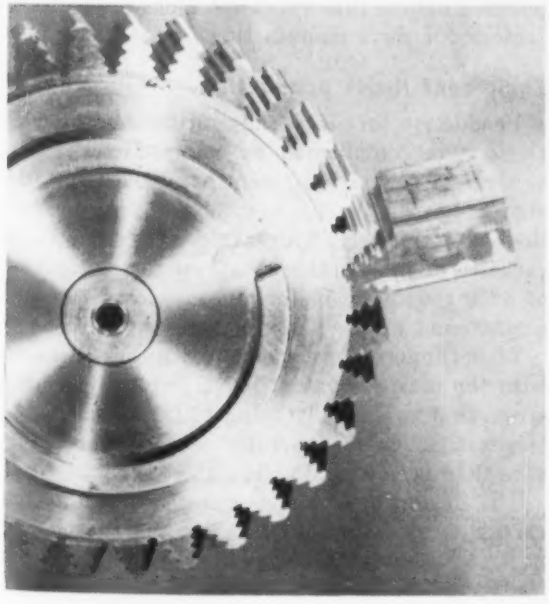
FIG. 4—Hoppers beside each grinder on the snagging line receive the castings and deliver them to the operator at waist level. After grinding, castings are again tossed into skips, foreground, and moved by lift trucks.

The visitor to the Eaton foundry is impressed not only with this material handling equipment and the high productivity of melting, pouring, and cleaning operations, but also with spacious lockers, showers, washrooms, lunchrooms and facilities for its employees. A well equipped first aid dispensary for health protection is staffed by registered nurses. Dust from grinding and sorting is continuously being exhausted by the most modern equipment. Departments are well lighted and painted in modern dynamic color schemes.

These steps taken by far-sighted management to create and maintain good working conditions cannot help but contribute to improved efficiency and a more profitable business.

Broaching ups production of

SUPERCHARGER WHEELS, BLADES



For accelerated production of turbo-supercharger wheels and mating blades, a broaching procedure has been developed for blade roots and the matching "Christmas Tree" slots in the wheel rim. Both jobs are handled on a 15-ton, 90-in. stroke vertical Lapointe machine through the use of interchangeable fixtures.

The wheel fixture embodies completely automatic indexing and hydraulic clamping. The blades are broached two at a time—the first blade being rough broached, and the second one finished broached, at the same stroke of the machine. Conventional tools are used.

The wheel is a conventional forging. The blades are broached from bar stock, Timken alloy 16-25-6.

Based on 80 pct efficiency, the time required for broaching the complete wheel, with 32 slots, is 65 min. The blades are broached at a speed of 60 finished blades per hr. Tolerances maintained are within 0.0005 to 0.0007 in.

Integrally stiffened sections are

EXTRUDED

Integrally stiffened sections are being extruded in 24S and 75S aluminum. At present, production is for military experimental use, but plans are made to make this material commercially available as soon as possible. Relatively wide sections open a new field of design in all branches of engineering.

By O. L. Mitchell
Chief Plant Metallurgist
Extrusion Div.
Reynolds Metals Co.
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The production of relatively wide integrally stiffened extruded sections opens a completely new field of structural design in all branches of engineering. It permits the employment of intricate sections and structures to take advantage of the most modern engineering techniques.

For years the unique stress conditions present in airplane structures have been met by a maze of structural members produced by sections of almost every description. This condition instigated planning by aircraft designers to obtain products which would fulfill their requirements and produce superior products at reduced costs. This demand from the aircraft industry was the driving factor in the development work which resulted in the production of integrally stiffened extruded sections in aluminum alloys.

It was the belief of many engineers that the progress of aircraft would partially hinge upon the production of integrally stiffened sections. This was backed up by actual data obtained from sections which had been machined from plate stock. So an agreement was entered into by the Reynolds Metals Co. and the U. S. Air Force, Air Materiel Command, to conduct research and experimental investigations to determine the feasibility of extruding integrally stiffened sections in aluminum alloys.

Basically, the requirement is wide, thin sheet material to which stiffener elements, such as T's', Z-bars, bulbs and similar members, are integrally attached. Naturally, the high strength aluminum alloys, 24S and 75S, are considered a prerequisite to the successful utilization of this type of material.

There are many different manufacturing methods that might be employed to produce integrally stiffened sections. The production of some of the more simple sections appears to be feasible by rolling; an investigation to determine its feasibility was instigated at about the same time as the one on the extruded sections (THE IRON AGE, Feb. 8, 1951, p. 87). However, many intricate shapes demanded by modern design require the stiffening elements to be of such complicated nature that extrusion alone seems satisfactory for their manufacture.

Equipment limits production

Production of integrally stiffened extruded sections is complicated by many factors. The general extrusion equipment available is not designed for, nor easily adaptable to, the production of relatively wide, thin sections. Press capacities are generally confined to a maximum of 4250 tons with one or two presses permitting a maximum working pressure up to 5500 tons.

Round ingots are employed with these presses, with the maximum-sized ingot employed in high strength alloys usually being 16 in. diam. Ingots larger than these generally require more pressure than is now available.

The design of available presses prohibits the extrusion of sections which cannot be enclosed in a 15-in. circle. For practical applications this maximum circumscribed circle is normally con-

sidered to be 12¼ in. The problem was one of producing very thin sheet up to 60 in. wide with specially designed stiffeners attached in predetermined positions.

There are several possible methods of producing sections wider than 15 in. by extrusion. One method is to employ a spreader die. With this method, material is fed from a solid round ingot through a die so constructed that a wider cross-section of metal is fed into the die orifice, forming a flat section of considerably greater width than the diameter of the round cylinder which applies pressure to the ingot.

Scrap loss high

The brief history of this type of die is disappointing. Due to the additional contact of metal in the die, and with the cylinder wall, pressure requirements are considerably increased. This, in conjunction with the higher scrap loss inherent in the process, resulted in the rejection of this method of manufacture.

A somewhat similar method incorporates the use of a rectangular ingot and a relatively wide die. Since previous investigations have shown that a substantial portion of available pressure is required to overcome sidewall friction, it is apparent that considerably higher unit pressures would be required with this method.

Several shapes have been successfully produced by extruding in either an S curve or a sine wave pattern, followed by straightening operations. Unfortunately, the placement of the stiffener sections is normally such that the die cannot be constructed to withstand the pressures required.

Another method of producing integrally stiffened sections is by extrusion through a U-shaped die opening. With this method, the stiffeners may be placed either on the concave or the convex side of the shape. Basically the process incorporates the extrusion of a contoured section which is later straightened. A solid billet is employed.

The use of this method has merit for certain shapes. It is particularly adaptable to production of moderately heavy sections in long lengths, due to the weight of the starting billet. The main disadvantage appears to be the thinness limitations of the sections that can be produced, due to the increased cross-sectional area of the billet. The unit pressures are substantially lower than those obtained by the tubular method for any given press capacity.

The tubular method of manufacture was introduced and advocated by Reynolds because previous experience indicated it incorporated many advantageous characteristics of the processes which are employed to produce other extruded shapes and extruded tubing.

With this method the stiffeners are formed on the outside of a seamless tube extruded over a mandrel. The sections are produced by employing a fixed circular die with proper orifices to form the desired configuration.

It has been established that substantially thinner cross-sections may be obtained by extruding a tube than by extruding a flat section. This is due primarily to higher permissible unit pressures on the tools, higher available unit pressures on the metal, and the movement of the mandrel through the die orifice.

The original attempts were to produce a shape similar to Fig. 1. The alloy employed was 61S. After obtaining manufacturing data with this

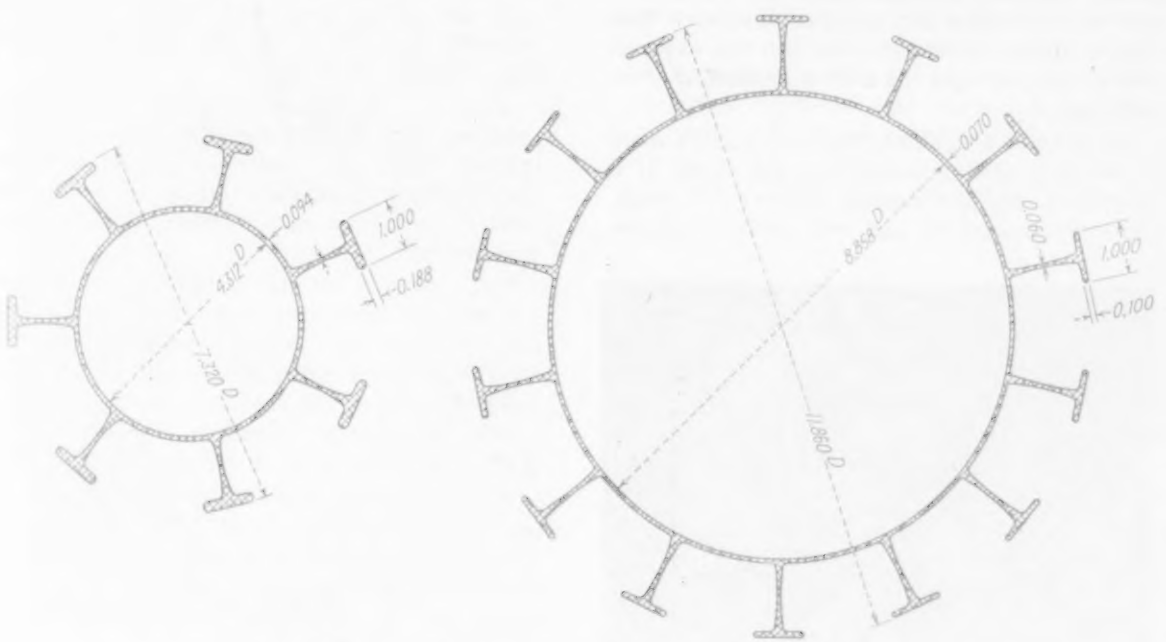


FIG. 1—Original section extruded by Reynolds had the dimensions shown at left. At right is a section of the extrusion from which a 28-in. wide sheet is made, the widest currently available.

alloy, the same section was quickly produced in alloys 24S and 75S.

This section was produced with a mandrel, approximately 4 in. diam, which produced a finished section approximately 14 in. wide. From this Reynolds was able to, in several stages, produce thinner sections in 28-in. widths. This appears to be the widest sheet that can be commercially produced with existing equipment. Since extrusion pressure is one of the limiting manufacturing conditions, the production of this section in 75S was possible only by increasing the thickness of the various elements. A later section is also shown in Fig. 1.

One of the more difficult problems confronting the extrusion of integrally stiffened sections is to open the tubular section and flatten to presently accepted commercial tolerances. During the flattening operation a slight concave surface is obtained on the section just opposite the stiffener elements, due to present inability to flatten this portion of the tube. All mechanical methods employed thus far have failed to satisfactorily remove these slight depressions.

Special mandrel tried

Provisions can be made to produce sections which are flat in the stiffener area by the tubular method employing a mandrel with flat spots in these areas. However, difficulties in indexing the mandrel with the die to control this make the method undesirable.

Lateral stretching cannot be satisfactorily employed due to small variances in the thickness of the sheet between the stiffener elements. This causes unequal stretching between the elements and quickly disrupts the correct spacing of these sections.

In spite of the difficulties now being experienced in producing commercial flat sheet, it is concluded that the present product is aerodynamically acceptable and will produce surfaces

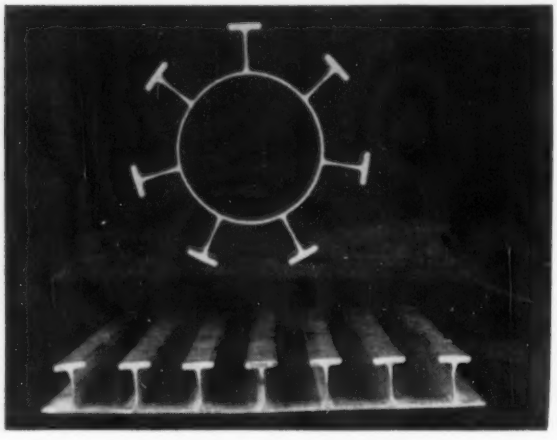


FIG. 2—Section cut from a Reynolds extrusion, shown as extruded and after slitting and flattening.

FIG. 3—An integrally-stiffened sheet extrusion emerging from the press at Reynolds Metals.

equally acceptable as presently recognized structures. However, not all aircraft engineers concur with this conclusion.

Laboratory results indicate the mechanical properties of integrally stiffened extruded sections are comparable to conventionally produced extrusions. Typical longitudinal properties for 75S-T6 sections are 86,000 psi ultimate, 80,500 psi yield, and 10 pct elongation in 2 in. Transverse mechanical properties appear to be substantially the same except the elongation drops to an average of 2.5 pct.

At the present time several sections have been produced for test purposes. Preliminary reports indicate this type of section corresponds favorably with calculated stress analysis. Additional sections have been manufactured for use in actual aircraft construction.

Until recently all efforts have been expended towards the production of material for aircraft purposes. However, normal peacetime production of aircraft is not sufficient to permit the development of equipment to produce sections of greater width. Thus, other commercial uses will reap the major advantages of utilizing this product.

Plans have been made to obtain equipment to permit the manufacture of integrally stiffened extruded sections in widths up to 60 in. However, until this equipment is secured, the production of sections will normally be restricted to the following conditions:

The overall widths of the flattened section cannot normally exceed 28 in. The minimum thickness of the various components of the section will depend upon the overall width and the

alloy desired. With 75S material, which possesses extremely high strength, the minimum skin thickness appears to be approximately 0.070 in. with the minimum thickness of the shank of the stiffeners approximately 0.060 in. Naturally these minimum dimensions will vary somewhat depending upon the design of the stiffener elements.

With 61S it appears that the minimum skin thickness may drop as low as 0.040 in. and integrally stiffened sections have been produced with the minimum thickness of the stiffener shank being 0.032 in. Under ideal conditions these appear to be commercially feasible.

Although the maximum length that may be produced is a function of the cross-section, present indications are that lengths in excess of 30 ft may require special consideration. This is particularly true with the high strength alloys. This is also affected by the design of the stiffener elements.

Stiffener shape, spacing can vary

Present manufacturing data indicate that the spacing and the shape of the stiffener elements may be changed within wide limits as long as the metal flow and torque conditions remain balanced during the extrusion process. For example, the stiffeners for the section in Fig. 1 may be placed in any arrangement which will produce uniform flow while keeping the torque conditions under control. If desired, it is permissible to employ added skin thickness in a particular area to replace a stiffener to facilitate joining of sections. However, the thickness must be added to the same side of the sheet that the stiffener elements are placed.

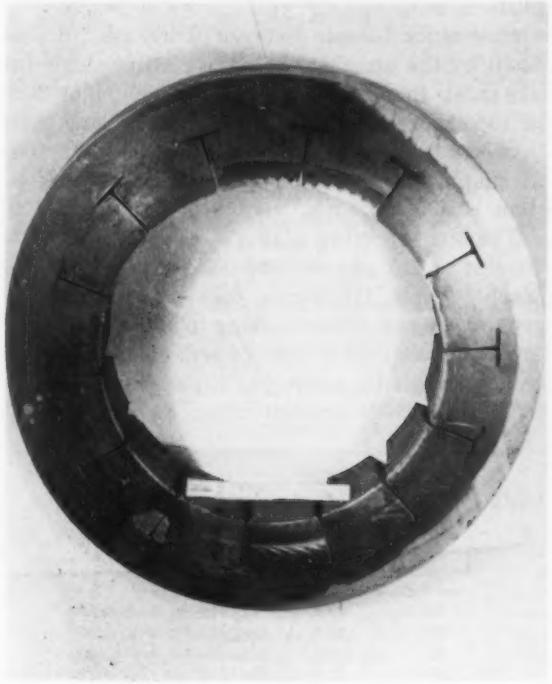


FIG. 4—The extrusion die used to produce the section on the right in Fig. 1.

What's Available

Approximate general limitations on dimensions of extruded integrally stiffened sections, produced on present equipment, are:

Overall width: Present maximum is 28 in. New equipment now planned will produce widths up to 60 in.

Minimum thickness: With 75S, minimum skin thickness is about 0.070 in., and minimum stiffener shank thickness is 0.060 in. With 61S it appears feasible to go as low as 0.040 in. minimum skin thickness, with stiffener shank thickness as low as 0.032 in. These limits vary somewhat with stiffener design.

Maximum length: Maximum length is a function of the cross-section. Lengths in excess of 30 ft. require special consideration.

The shape of the stiffeners appears to be of minor importance. They may be T-shape, L-shape, bulbs, or similar designs, without producing excessive manufacturing difficulties.

Increasing the height of the stiffeners reduces the maximum width of the sheet that can be produced. In addition, experience indicates that increasing the height of the stiffeners above 1½ in. materially increases extrusion manufacturing difficulties. This is particularly true when a substantial increase in extrusion ratio occurs due to the reduction in available unit pressure.

There appears to be no preferred ratio of skin thickness to stiffener thickness. This is governed entirely by flow conditions which are substantially different for the various alloys in any given skin thickness.

Integrally stiffened extruded sections are presently available only on an experimental basis for defense purposes, but plans have been made to make them available commercially at the earliest practical time.

New Books

"Fundamentals of Electrical Engineering," by F. H. Pumphrey, is primarily designed for students specializing in other fields of engineering so that they can gain a basis of knowledge of the electrical field. It is also intended as a text for first year electrical engineers and as a reference during the early professional life of the student. It emphasizes the intelligent selection and operation of electrical equipment. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. $7.65. 668 p.

How the metalworking industry uses LP gas

By Oliver Johnson
Director of Research
The Iron Age

The metalworking industry is a fairly substantial user of LP gas, this Iron Age survey discloses. Its 1950 consumption was in the neighborhood of 200 million gallons. The survey shows what types of plants buy it, the processes in which they use it and where they are located.

It has been generally assumed that the metalworking industry is a very small user of liquefied petroleum (LP) gas. It is true that of 1950 consumption of 3.3 billion gallons, some 2.1 billion gallons were used domestically for cooking, etc. Of the remaining 1.2 billion gal, the metalworking industry is estimated to have used about 200 million gal. This is about 16.7 pct of the total industrial use of LP gas (propane, butane, etc.).

To make this estimate, and to find out where and how the metalworking industry used LP gas, the market research division of THE IRON AGE mailed 7000 questionnaires to metalworking plants employing 100 or more production workers. Replies were received from 1431 plants, which represents approximately 21 pct of the metalworking industry in the United States.

While all of the 1431 plants involved in this survey sample employ 100 or more production workers it is interesting to see how they break down into various size groupings. The breakdown is shown in Table I.

The survey developed the fact that 304 of the 1431 reporting plants use liquefied petroleum gas. How do the using plants break down as to size? Table II gives the answer.

The 304 reporting plants that use LP gas are 21 pct numerically of 1431 reporting plants in the survey sample. However, these 304 plants account for the employment of 465,997 production workers which is 37.6 pct of the 1,238,329 workers in all of the 1431 reporting plants. This again shows that the larger the plant the more likely it is to use LP gas.

How much LP gas do these plants use? Broken down by the amount used, the picture shapes up like this: In the group using 100,000 gal or more in 1950 there were 85 plants; in the group using between 10,000 and 100,000 gal each there were 93 plants; the balance (126 plants) used less than 10,000 gal each.

The 304 reporting plants used quite a sizeable amount of LP gas in 1950—58,647,346 gal to be exact. Table III shows this use by industry groups among the reporting plants. Table IV gives a geographic breakdown of consumption among the plants answering the survey questions.

There is less concentration on standby use

TABLE I

PLANT-SIZE GROUPINGS

No. plants reporting	Pct of plants in sample	Production workers per plant
620	43.3	Employing 100 to 300 workers
349	24.4	Employing 300 to 600 workers
171	12.0	Employing 600 to 1,000 workers
291	20.3	Employing over 1,000 workers
1,431	100.0	

TABLE II

PLANT-SIZE ANALYSIS

Production workers per plant	Reporting plants using LP gas	Pct of plants in this bracket	Reporting plants not using LP gas	Pct of plants in this bracket
100 to 300 workers	79	12.7	541	87.3
300 to 600 workers	78	22.3	271	77.7
600 to 1,000 workers	46	26.9	125	73.1
Over 1,000 workers	101	34.7	190	65.3

alone than might be expected, though some of the plants that use LP gas continuously do not necessarily use it in volume. Some use it only for atmosphere control in heat treating furnaces, not for heating the furnace. Of the 304 plants in the sample, 126 use it for standby, 159 use it continuously and 19 use it for both purposes.

Of the plants using LP gas for standby, 110 turned to it because of a shortage of natural gas, 21 because of a shortage of manufactured gas. Only one reported its use because of an oil shortage.

Table V shows the principal uses for LP gas in the plants replying to the questionnaire. Other uses reported were numerous. They are listed in Table VI.

This report has presented data on the use of LP gas by metalworking plants which constitute a survey sample of 1431 plants employing 1,238,-329 production workers. This sample therefore accounts for 21.4 pct of the worker employment of the whole industry. These plants in the survey sample used 58,647,346 gal of LP gas in 1950. The $64 question now arises: "How much LP

BY INDUSTRIES

TABLE III

Govt. Ind. Code	Description of Industry Groups	1,431 Reporting Plants: Workers in reporting plants (col. 1)	1,431 Reporting Plants: Plants reporting	304 Reporting Plants Using LP Gas: Workers in plants using LP gas (col. 2)	304 Reporting Plants Using LP Gas: Plants using LP gas	304 Reporting Plants Using LP Gas: Pct. of workers in plants using LP (col. 2 vs 1)	304 Reporting Plants Using LP Gas: Gal used in 1950
19	Ordnance and accessories	20,041	11	5,001	4	25	15,485
25	Furniture (metal)	14,841	29	906	3	6	420,000
331	Steel works and rolling mills	133,904	66	35,210	12	26	5,404,151
332	Iron and steel foundries	41,951	110	4,553	11	11	2,285,125
333	Nonferrous smelting	9,591	19	2,910	5	30	95,327
335	Rolling, extruding, etc. (nonferrous metals)	36,553	31	16,065	13	44	17,626,903
3391	Steel forgings	12,176	27	6,400	4	52	2,560,118
339 Bal.	Miscellaneous primary metals	11,373	32	3,188	9	28	327,521
341	Tin cans	7,008	16	3,633	6	46	1,897,000
342	Hand tools and hardware	29,066	49	5,920	7	20	317,583
343	Heating and cooking apparatus	34,143	73	9,350	19	27	661,463
344	Fabricated structural products	36,596	102	3,978	16	11	2,763,461
346	Metal stampings	24,998	63	9,864	15	39	1,432,586
347	Lighting fixtures	3,080	10	1,300	3	42	1,070,000
348	Fabricated wire products	7,473	19	270	1	3	35
349	Barrels, bolts, nuts, screw products	21,228	42	6,200	6	29	391,934
351	Engines and turbines	22,344	16	8,064	4	36	954,000
352	Agricultural machinery and tractors	57,389	43	34,000	8	59	2,924,212
353	Construction and mining equipment	32,576	52	8,700	10	27	937,971
354	Metalworking machinery	38,206	67	9,984	15	26	1,569,640
355	Machinery for special industries	37,868	58	7,345	11	19	147,313
356	General industrial machinery	26,735	63	8,629	12	32	400,012
357	Office machines	12,280	17	3,600	4	28	28,660
358	Household machines	39,057	44	17,861	12	46	3,390,739
359	Machinery parts	28,700	40	7,250	5	25	596,857
36	Electrical equipment	120,775	115	51,610	31	43	1,973,817
371	Motor vehicles and parts	201,794	87	120,785	31	60	7,098,424
372	Aircraft	66,717	11	39,600	6	59	816,696
373	Shipbuilding	24,293	14	11,183	3	46	60,872
374	Railroad equipment	21,920	11	12,000	2	55	350,000
379	Misc. transportation equipment	2,550	4	.....	....	....	.....
38	Instruments, clocks	33,931	35	5,900	9	17	238,307
39	Silverware, jewelry, misc.	25,960	60	4,740	7	18	191,154
	Total Reporting Plants	1,238,329	1,431	485,997	304	38	58,647,346

TABLE IV

ANALYSIS BY REGIONS

Section	Geographic Sections	1,431 Reporting Plants: Workers in reporting plants (col. 1)	1,431 Reporting Plants: Plants reporting	304 Reporting Plants Using LP Gas: Workers in plants using LP gas (col. 2)	304 Reporting Plants Using LP Gas: Plants using LP gas	304 Reporting Plants Using LP Gas: Pct of workers in plants using LP (col. 2 vs 1)	304 Reporting Plants Using LP Gas: Gal used in 1950
1	New England	98,623	147	34,971	34	35	6,191,174
2	Middle Atlantic States	273,734	334	63,878	57	23	9,078,029
3	South Atlantic States	34,252	54	10,524	12	31	2,441,562
4	East North Central	598,825	605	272,801	136	45	24,839,475
5	East South Central	38,675	54	3,580	8	9	2,000,312
6	West North Central	60,396	86	22,685	18	38	2,982,017
7	West South Central	37,295	45	1,348	6	4	50,194
8	Mountain States	15,250	15	2,400	3	16	7,941,760
9	Pacific States	81,279	91	53,800	30	66	3,122,823
	Total Reporting Plants	1,238,329	1,431	465,997	304	38	58,647,346

Sections: 2=New Jersey, New York, Pennsylvania; 3=Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia; 4=Ohio, Indiana, Illinois, Michigan, Wisconsin; 5=Kentucky, Tennessee, Alabama, Mississippi; 6=Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas; 7=Arkansas, Louisiana, Oklahoma, Texas; 8=Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada; 9=Washington, Oregon, California.

TABLE V

MAJOR USES

	Standby	Continuous
Heat treating	51	83
Heating billets	20	14
Annealing	41	47
Baking or drying ovens	64	62
Other uses	34	44
Number of plants reporting	145	178

gas does the whole metalworking industry use?"

To expand these survey figures by the usual research methods in order to arrive at a total industry figure is not sound because there is not enough information on the physical layout of individual plants. It is not certain that they have the yard space for storage facilities without violating the standards of the National Board of Fire Underwriters or various state and municipal regulations.

Having studied and worked with this report perhaps it would not be too wild a guess to assume that the metalworking industry consumed in 1950 from 3 to 3½ times the amount covered by this survey. That would be a total in the vicinity of 200 million gal. The responses also indicated that a number of companies are now installing or thinking of installing liquefied petroleum storage facilities.

TABLE VI

MISCELLANEOUS USES

Galvanizing kettles—Brazing torches—Pilots on furnaces—Welding—Ingot heating—Refractory drying—Hot tinning—Cutting torches—Laboratory hot plates—Laboratory assay furnaces—Melting (nonferrous)—Smelting and refining of lead, zinc, and aluminum—Soldering tin cans—Heating washer solutions—Die casting machines—Testing gas ranges on assembly line—Testing gas-fired heaters—Heating truck fuel—Stress relieving—Soldering—Vitreous enameling furnaces—Boiler pilots—Lead pots—Glass melting—Glass bending—Space heating for certain locations—Carburizing—Engine testing—Preheating—Flame hardening—Parkerizing—Penetrating—Torch drying of facings of molds (foundry)—Plastics production—Manufacture of hydrogen—Heating sealing compound—Metalizing—Television tubes (glass)—Application of solder to auto bodies—Heating metal cleaning solutions—Engine fuel—Preheating permanent molds.

This report has necessarily been slightly condensed here. The complete survey report may be secured by writing on your business letterhead to Market Research Division, The Iron Age, 100 East 42nd St., New York 17, N. Y.

Metalworking Has Stake in Success of Trucking

Truck shipments of iron, steel products rise . . . Truckers confident they can meet crisis test . . . Tire trouble may come later . . . Feel safer on parts—*By Ted Metaxas.*

New York—America's fleet of 8,600,000 trucks are transport lifelines to industry, community, and farm. The defense freight load is mounting to emergency proportions and metalworking and steel plants have a stake in what trucking can do in crisis.

Flexibility of truck transportation has permitted firms to spread beyond the traditional proximity to suppliers and rail terminals. They can go where the air is cleaner and labor pool fresher. Trucks cart more steel to metalworking plants and bring more finished products to market than ever before. Steel and its multitude of end products ship well in trucks. They have weight but little bulk and are not perishable or flimsy.

Truck shipments of iron and steel products rolled upward in postwar years. With 1946 as the 100 pct base, one estimate puts the acceleration of these shipments to 252 pct of the base in 1950. Last year 63 pct of all automobiles were shipped by trucks. As another example, for-hire trucks in the first quarter '51 hauled 37.4 pct more tons of heavy machinery than the same quarter last year. Truckers know that the steel and metalworking tonnage won't stop climbing.

It Can Be Done

They are confident they can handle the immense hauling job shaping up. Washington sees their industry as essential but truckers want assurances of specific allocations of metals and rubber to keep the trucks coming.

In 1941, truckers could put about 4.8 million units on the highways. Contending with the draft and stoppage of truck output, they did the job. Today they are proud of the 8.6 million trucks on the road. Over 1.1 million of these belong to for-hire haulers and 4.7 million are privately-owned.

The driving pace of World War II deteriorated equipment. But postwar business was so good that truckers rejuvenated many trucks and supplemented them with a record number of 3 million new units. Average age of trucks now is past 7 years when it was about 4 years before the war. But that's not as bad as it sounds. The old trucks are fit.

Truckers though can see trouble sitting patiently in the background. Many more firms are dependent on trucking today. Their business has kept postwar trucking operations at the summit and defense loads will push their demands higher.

A Flying Start

Defense Transport Administration has suggested to NPA that 1.3 million trucks be produced this year when replacement schedules are unusually high. Truckers want allocations right away and glare at the freight car program, soon to come under CMP. Some will admit that steel mills have a profit incentive to work for the automotive industry but need a little official urging to supply the inconsistent freight car market.

Output of 650,295 trucks in the first 5 months of 1950 gives the DTA goal a flying start. Few new

Turn Page

Snub New England Mill

Hartford—Chances for a New England steel mill sank to a new low when the Connecticut Legislature let two important bills die in its closing session last week. One bill would have granted the right of eminent domain for the $250 million mill in the New London area.

The second bill would have permitted the State Aeronautics Commission to sell or lease land at Trumbull Airport for the mill if opposition proved too great at New London.

Mexican Mill Gets $5 Million Steel Expansion Credit from U.S.

New openhearth and hot-strip mill . . . To boost output 70,000 tons

Washington — Export-Import Bank has approved a $5 million dollar credit for expansion of the Altos Hornos de Mexico mill at Monclova, Mexico.

The new loan is part of a $150 million grant in favor of Nacional Financiera, S. A., approved last year by the Export-Import Bank.

Existing plant at Monclova consists of an integrated mill, including a blast furnace, three openhearths, a plate and hot-strip mill, cold-rolling and tin-plating facilities.

Expansion Features

Proposed expansion includes blast furnace improvements, addition of a new and larger openhearth furnace, new hot-strip mill, and new processing and tinplate facilities.

The improvements will increase finishing capacity from 115,000 tons to 185,000 tons a year.

INDUSTRIAL SHORTS

Rebuilding Furnaces — Rust Furnace Co. is rebuilding three slab reheating furnaces for REPUBLIC STEEL CORP., Cleveland. Rust recently installed a new 100-ton capacity furnace at the plant.

Overseas Construction—Simon Carves, Ltd., of Stockport, England, will build a battery of 40 coke ovens for the GREAT LAKES CARBON CORP., St. Louis. The ovens will be of British design, able to carbonize 530 tons of coal per day for manufacture of high grade foundry coke. The contract is worth $3 million.

New Company — Fabricated Steel Inc., a newly-organized company, has bought the Fabricating Div. of SOUTHWESTERN OHIO STEEL, INC., Hamilton, Ohio. It is now fabricating structural and industrial shapes. William J. Wolf is president.

New Engine Capacity—CUMMINS ENGINE CO., INC., Columbus, Ind., will spend $6 million to expand engine production capacity. It is the third major program announced within the past 9 months and will increase Cummins capacity at least 50 pct over the 1950 record level.

Standard Code—Designers and builders of more than 25,000 different types of gas equipment for industry voluntarily adopted a "code of ethics" governing standards of performance and safety. The group is a division of GAS APPLIANCES MANUFACTURERS ASSN.

Thor Licenses — The Italian firms, ALDO GALANTE and SAN GIORGIO, south of Genoa, have been licensed by Thor Corp. to manufacture its home laundry appliances. Avoidance of import duty into Italy lowers price of product in Italian market.

Change in Operators — The dump car, trail car, and general car business of AUSTIN-WESTERN CO., Aurora, Ill., was transferred to and will be operated from Baldwin-Lima-Hamilton Corp., Eddystone, Pa. Assets were acquired Mar. 8.

Division Sold—As of the close of business on June 2, Continental Copper & Steel Industries, Inc., has sold its QUALITY HARDWARE MACHINE DIV., Chicago, to Century American Corp. and Wilmington Industries, Inc.

Plumbing Plant — Work has started on the construction of a $50,000 plant for the COSPER CO., Birmingham. The firm already has a plant in Bessemer which processes and finishes cast iron fittings for the wholesale plumbing industry.

Machinery Plant — Westinghouse Electric Co. will build a new machinery manufacturing and repair plant in Birmingham. Construction contract went to DANIEL CONSTRUCTION CO. Plant will have 30,000 sq ft of floor space.

New Field—A new entrant into the steel tubing field is the WOLVERINE TUBE DIV. of Calumet & Hecla Consolidated Copper Co. Under an agreement with Karmazin Products Corp., Wyandotte, Mich., Wolverine Tube got exclusive rights to produce tubes under Karmazin patents.

Scrap Office Move — LURIA BROS. & CO., scrap iron and steel brokers, have announced removal of their offices from 1000 Statler Bldg. to 917-918 in the same building, at 20 Providence St., Boston.

Changing Need — The 32nd annual international cost conference of the NATIONAL ASSN. OF COST ACCOUNTANTS will deal with effects of defense on industrial accounting methods and new applications to fit changing needs. The conference will be held at Palmer House, Chicago, from June 24 to 27.

New Control—Since lack of space prohibited manufacture of their own saw blades, SKIL-SAW, Inc., Chicago, makers of portable power tools, purchased controlling interest in Loud-Wendel, Inc., Middleport, N. Y., manufacturers of circular wood saws, industrial knives, dado sets.

trucks have slipped into war so far. Defense in its more violent production phase will take many more later and truckers fear that military uses may sap output for the civilian—unless NPA makes some commitments.

Tire output this year has outstripped 1950. In the second quarter '51, military demand drew away 12 pct of truck tires and estimated military needs for the third quarter are 25 pct. It is an omen of ever-increasing need.

Truckers have not reported any serious tire shortages but they are wary because suppliers' stocks have shrunk like a woolen sock. They don't have much respect for the mountains of stockpiled natural rubber that has not stimulated production but raised prices. Some truckers fear they are living on the past—on warehouse stocks—with the shortage due to catch up later. Recapping tires is considered a better weapon against it than before.

Safe on Labor—Now

Truckers feel more secure on parts and are willing to let the automotive industry determine the number and type to be produced. Shortage of alloys will reduce quality of many parts and truckers say that the substitute materials used in parts during World War II were "lousy." They led to great expense and time lost because of constant replacement.

Holding its labor is no immediate problem to for-hire and private truckers. In 1949 they paid an average $3414 per year against general industry's $2869. If Washington elects to stretch the workweek, premium pay and overtime hours could lure away drivers and other personnel. Truckers want drivers on the critical occupations list although they are classed as semi-skilled labor. During the war they were irreplaceable. This time the draft won't sting trucking as severely. Many drivers are vets or older men and thus draft-exempt.

Truckers warn that if they must raise wages to protect their work force, rates must also rise. During World War II many firms lost money because of the slow-working price control law, meanwhile run-

ning their equipment down. Since wages in trucking take 50¢ of the incoming dollar, every 2¢ wage increase slaps a 1 pct rise onto operating expenses.

The industry is now promoting a campaign to improve roads and to clarify the hodge-podge of state laws of weight loads. DTA has already asked for realism on weight loads in a letter to all state governers. Truckers also are squirming when they think of the tax traps municipalities are readying for them. They resist charges that they are destroying roads—saying that can be more justifiably attributed to weather, faulty construction, and the record load of all traffic.

EXECUTIVE INNOVATION—VP for Customer

Metal Electric Processing Co. officer talks for man-who-pays . . . Handles all contacts, speeds small parts through tightly scheduled plant . . . Ingenuity pays off—*By Bill Olson.*

Toledo—"Vice-president for the Customer." That's the title Clyde W. Morrison, president of Metal Electric Processing Co., dreamed up to dramatize the important part customers play in his business.

MEPCO pioneered in the job shop business of copper brazing. Morrison and his crew of 60 have built a business and reputation by helping customers save money and giving customers service.

Those policies have attracted big names like Ford, Oldsmobile, Republic Steel. The plant now has six production furnaces.

Saw Future Possibilities

Mr. Morrison's brother, O. B. Morrison, is the VP. He handles all customer contacts. More important, he speaks for the customer in the tough job of getting many small parts through a tightly scheduled shop. As a corporate officer, the VP can talk with authority when it comes to getting the customer what he needs when he needs it.

MEPCO's 16-year history reaffirms the idea that hard work and ingenuity still pay off. Clyde Morrison got out of engineering school in 1931 when business was still in the morning-after stage of its 1929 binge. He got a job with the Marion Reserve Power Co. in Marion, Ohio.

In 1935 Morrison took some turbine bearings to GE's Cleveland plant for rebabbitting. There he saw a small electric furnace. He was impressed with the possibilities of the furnace for controlled atmosphere brazing. He saw himself as a small businessman.

Morrison borrowed $2750, a big chunk of change in 1935, and bought his first furnace. He was in business—as salesman, production man, shipping room clerk.

A year later he bought a bigger, production model that could turn out more work. He made his purchase at the metal show in Cleveland. He even shipped customers' parts to Cleveland for furnace demonstrators to work on. He lost a lot of parts as souvenirs, but the advertising was worth it.

Metal Electric's strong point is saving money for the customer. Clyde Morrison works closely with company engineers. He points out ways of substituting inexpensive brazed assemblies of stampings and screw machine parts for high-cost forgings and castings.

This type of ingenuity and cost-conscious service pushed Metal Electric ahead. Ford's Borg-Warner hydraulic transmission uses a part produced by MEPCO. The forward sun gear tube combines two pieces of tubing and two screw machine parts, brazed together.

Like many small plant owners, Morrison has given plenty of thought to where his shop fits in the defense picture. Right now the company is devoting about 10 pct of production time to defense.

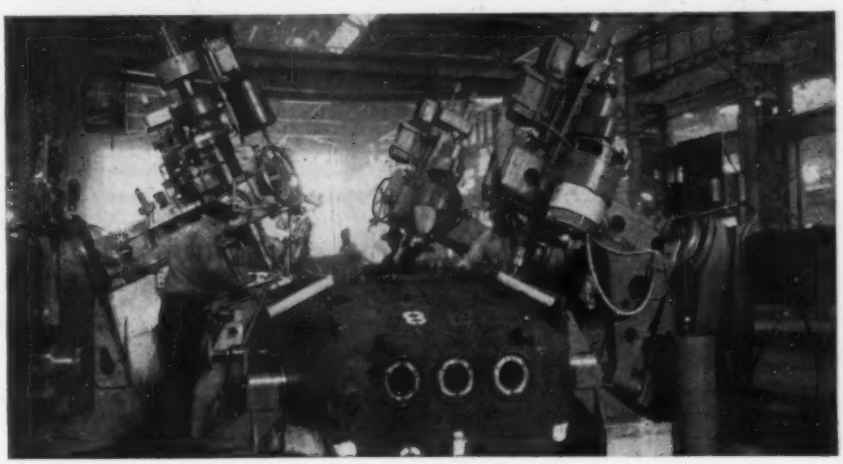
Morrison has been out beating the bushes for defense work. As he puts it, "there's damn little about." He figures that picture is going to change. Morrison thinks the 10 pct figure is average for the stamping industry now. But in 6 months he expects his plant to be giving 50 pct of production time to parts and assemblies for defense.

During World War II Morrison and his plant collaborated with Republic Steel Corp. in developing a production process for copper brazing of incendiary bombs.

Russian Asbestos Arrives

Mobile—The first Russian cargo unloaded here in 2 years arrived this week. It consisted of 2 million lb of asbestos consigned to roofing manufacturing plants in Mobile and St. Louis.

HOLES IN HULL: Big multiple-head drilling machine makes holes in slope sheets on tank hull at Baldwin-Lima-Hamilton plant. Dowels hold hull in position.



"Ersatz" Plating for Cars NOT Around Corner

Changes forced by shortages less drastic than public believes . . . Biggest changes on interior hardware . . . Nickel on outside parts cut to 0.001 in. or less—*By W. G. Patton.*

Detroit—There is much confusion about current automotive bright work practice. Stories about "ersatz" plating methods have been a good source of news out of Detroit. Many motorists have concluded the quality of practically all 1951 model plating has been seriously lowered.

Limitations on supply and use of nickel have forced changes in plating specifications. But changes so far, while significant, are much less drastic than the public believes.

Nickel Cut Down

Most car producers will continue to use plating as long as chromium is available. "Blackout" cars with painted bumpers are a last resort.

Carmakers are aware of the seriousness of the brightwork problem. They are studying every available protection method developed by outsiders and have extensive development work under way in their own laboratories.

Up to the present, the most drastic changes in plating practice have been made in interior trim and hardware. Changes on exterior parts have consisted mostly of decreasing or omitting the nickel entirely.

Bumpers, bumper guards and outside door handles are still being plated with copper, nickel and chromium. The nickel plate has been cut to 0.001 in. or less, depending on the availability of nickel. Protection against corrosion is definitely less than was previously offered.

A significant change has occurred on hub caps. Prior to critical alloy shortages, many hub caps were made by plating a carbon steel blank with zinc, crimping a thin plated brass sheet over the steel. Now many hub caps are made by forming thin sheets of chromium-type stainless steel. A chromium flash is usually added to improve finish. This type hub cap was also available prior to the present shortage.

Practice for grilles has changed. Whereas many grilles were formerly zinc base die castings, most are now steel stampings. Present parts are usually plated with copper and chromium. No nickel is permitted for grilles. Corrosion protection is inferior to grilles having the added 0.001 in. or more of nickel.

Hood ornaments and luggage compartment decorations are being copper and chrome plated. Sometimes a lacquer coating is used.

Interior Hardware

Biggest changes in plating practice have been made in interior hardware and trim. On these parts copper and chrome plating over zinc and chrome over the base metal is being tried extensively. One producer has an entirely new process ready for finishing interior parts.

Some 1951 model cars do warn that government restrictions have forced a change on *some* plated parts. On these it is inadvisable to use harsh scouring or abrasive materials for cleaning. Where a lacquer has been used over the plating, owners are told not to try to touch up the areas where the lacquer protection has been destroyed.

A thin coating of 10W oil applied to bumpers and grilles and wiped off gives considerable protection against corrosion according to experts. If done three or four times a year, the car owner should have little trouble. Incidentally, the Pittsburgh and St. Louis industrial atmospheres are even tougher on plating than the salt atmospheres along the eastern and western seaboards.

SUPPORT: Republic Steel Corp.'s four new 275-ton openhearths at Cleveland will stand on 7600 tons of steel piling. Piles are 10 in. in diameter, 110 ft long. Pile driver pushes down one an hour.

RR's, Freight Car Builders Protest Third Quarter Steel Cuts

Washington—Railroads and car builders are protesting cuts in steel allocations now facing the freight car program for the third quarter.

For the first time since April, 1949, freight car production in May came close to reaching the 10,000-car-a-month goal under its NPA steel set-aside program.

May production was 9774 units and April output 8274, to bring the 5-month total this year to 37,-

050 units. This is about 12,000 units short of the number for which steel had been allocated.

Third quarter steel allocations will probably be less than 700,000 tons. Output may drop to 8000 cars a month. The Defense Transportation Administration predicts enough steel will be available for 9500 units monthly. New freight car orders received during May totaled 4919, to bring the backlog of unfilled orders to 150,628 as of June 1.

Eastern Foundries Have Coke Now—But

Supply expected to tighten in late summer . . . Expect some Alan Wood coke ovens down for repairs in August . . . Higher demand forecast after summer period—*By Bob Hatschek.*

Philadelphia—Foundries in this district are going to bat with two strikes on them—a pig iron shortage and a scrap shortage. The third strike, a coke shortage isn't due to be delivered—at least not yet. Reports are heard, however, that coke quality leaves something to be desired. Excess sulfur content and small sizes are the main complaints.

Unlike their pathetic iron inventories, foundries' coke stocks are in pretty good shape and local suppliers are doing a good job of keeping foundrymen supplied. Philadelphia Coke Co. is reported to be making other grades for future commitments as well.

Hurts Here, Helps There

While foundrymen won't like losing the pig iron production from Alan Wood Steel Co.'s blast furnace, which will be out of blast for repairs next month, the coke it would have used will add to the total supply in the district. Foundry vacation periods, traditionally in July, will also mean an appreciable reduction in the demand.

August is likely to be the turning point. Then Alan Wood's blast furnace is due back in blast, thus cutting one of the July coke bonuses. Another sore spot for August is that one of the Alan Wood Coke oven batteries will go out of production for repairs. It is the smallest of three that the company has but it will hurt.

The battery will be taken out of production about eight or ten ovens at a time so that the supply won't be severely cut but even so it will mean that up to 24 ovens will be out at a time. Expected loss of production will be about 150 tons of coke a day for 3 months.

Later on in the year, cold weather will heap greater demands on the supply. High production rates have previously contributed to coke shortages in the winter months—last year was a prime example. With steel production breaking all records this year and with no let-up in sight for demand on either steel or pig iron, a winter coke shortage for 1951 seems to be the prospect.

Foundrymen recognize these symptoms and will be trying to add to their coke piles while it is still possible. It won't be too easy to do this, though, because there is a furnace coke shortage right now and coke suppliers are trying their best to eliminate it.

"Been nice if you'd looked into the manpower situation before you moved us out here, boss."

BITS AND BRIEFS

By Bill Packard

First product to come out of U. S. Steel's new Fairless Works will be cold-rolled strip—probably by spring of '52. Hot-rolled bands to be shipped from Pittsburgh to feed the mill. Tube mill will probably be next in operation . . . **Green River Steel Corp. applying to Securities and Exchange Commission for registration of $4 million of 3½ pct debentures due in 1961—also 320,000 shares of common stock at 25¢ par. Other financing includes $5 million loan under defense Production Act and $3.5 million RFC loan** . . . Warnings being sounded that price ceilings may keep meat away from the dinner table. Surely, food is as much a necessity as any basic metal or manufactured product . . . **A General Electric service engineer reports engines of jet aircraft in Korea have been successfully started by the jet blast of another plane placed directly in front. GE calls it "artificial respiration"** . . . Twenty-seven-year-old Edwin W. Blase honored by Chemical Engineers of Greater New York as "sole inventor of unique Q-process for recovery of terramycin." Mr. Blase is project engineer in Research & Development Dept. of Chas. Pfizer & Co. . . . **RFC loan policy being revamped. To qualify for loan you'll have to prove you're essential by virtue of certificate of necessity or defense contract—or you'll have to prove your product or service is essential in your area** . . . Norbert C. Rubin, vice-president, Yoder Co., returning from Portugal after concluding negotiations for equipping pipe mill. Yoder will furnish two electric-weld pipe mills for about $450,000 and accessories for about $400,000 . . . **Freight car builders hitting their 10,000-car-a-month stride just as their steel allotment is being shaved. They are likely to turn out close to 10,000 cars a month for next 2 or 3 months. After that output will fall back a little if**

steel quota isn't raised . . . Ernie Weir, National Steel chairman, urging business men to take an active interest in politics. His criticism of leadership in both political parties caused a lot of heads to nod at annual meeting of purchasing agents . . . Rumors of support for upward revaluation of some Western European currencies (following ECE suggestion) persist despite open opposition from U. S. Result would be higher prices for imported raw materials.

ORDNANCE SHELL SPECS—A Tough Order

Producers object to proposal for higher physical specs . . . Would hinder production . . . Military claims higher specs will yield better penetration of light armor —*By Bill Czygan.*

Detroit — When Ordnance recently proposed general increases in physical specifications on shells and other projectiles, producers were quick to express a contrary view. The military says higher physicals will produce better penetration of light armor without splitting the shell cavity. Producers point to current experience in making the 5-in. Navy Rocket head and say production problems would eclipse advantages gained.

Specifications on the 5-in. rocket head call for 78,000 psi proof stress, 105,000 psi tensile strength, 18 pct elongation and 35 pct reduction in area. Manufacturers have found that a higher chemistry steel was required in order to attain these properties, and that this in turn created problems in forging and machining. The net result is lowered production and substantial increases in cost.

Save on Alloys

With the alloy situation becoming more critical, industry adds that considerable savings in manganese would be possible in large-scale shell manufacture if lower physicals and therefore lower chemistry steel could be used. The general feeling is that Ordnance might consider producing a limited number of projectiles for use in armor-piercing work, while still giving the green light to lower properties in shells for general purpose use.

The chief objections raised against higher overall shell physicals are that the problems encountered on the rocket head would be multiplied manifold, and could very likely develop into a serious bottleneck. Higher alloy content would increase steel cost, besides producing steel procurement headaches.

Compare Machining Data

Difficulties in forging, machining, cold-nosing, heat treating and finish machining would produce substantial increases in cost of many operations, man-hours per machine and per piece, scrap produced, tool costs and use of strategic materials in both the steelmaking and shell fabrication.

Producers state that machinability could be improved about 35 pct if 12 pct min elongation were adopted instead of the present 18 pct on the 5 in. rocket.

They advance a comparison of typical basic machining data on the 4.7 in HE AA shell made during the last war with current data on the Navy rocket. Although the two shells are quite similar in chemistry, the 4.7 in. shell specifications called for 85,000 psi yield strength, 12 pct elongation and 25 pct reduction of area.

Rough machining was possible at 315 sfpm with a feed of 0.020 ipr, as compared to the 256 sfpm and 0.013 ipr possible on the 5 in. rocket when made to include the higher physicals. The same relative differences exist in finish turning and the other operations, with proportionate reductions in tool life and production.

Since even higher requirements than on current projectiles were proposed, the manufacturers feel that it would be to the best interests of all concerned if Ordnance would consider the feasibility of lowering the minimum physical specifications. They believe that at least a lower elongation would make considerable economies possible, while still producing a satisfactory shell.

"All week you've been late for work, so yesterday I called a plumber."

Shipyard Workers Get Raise

Washington — WSB has approved wage increases for 20 shipbuilding yards. The board said wage rates in these yards were well below the normal industry level at the Jan. 1950 base date.

The approvals bring the first-class mechanic's rate in most yards to $1.80 per hr, an increase of approximately 15 pct. Rates paid in Navy yards are higher than WSB's new rates.

British Loan to Spur Defense

Washington—Britain has been authorized by ECA to use $112 million of the military aid funds to purchase machine tools for production of aircraft bodies, jet engines, tanks, and guns under the mutual defense program.

Simultaneously, $7.7 million in Marshall Plan funds were granted for territorial development of manganese, copper, rubber, and other strategic materials.

DPA Will OK Hazelton Steel Fast Tax Amortization Certificate

Washington — DPA said last week it would approve the tax-amortization certificate submitted by Hazelton Steel & Tubing Co.

The firm's application is under fire from Congress because of charges raised by the government shortly after World War II against officials of Empire Ordnance Co. who are now associated with Hazelton.

Rep. Hardy, D., Va., chairman of a house subcommittee investigating the write-off application, said he "would not have approved the loan."

Hold Steelmaking Pattern in '53

New York — The balance of steelmaking capacity is shifting slightly with the emergency period expansion but steel areas will still maintain the traditional overall pattern, indicate figures supplied by the American Iron & Steel Institute. They follow in districts and in millions of tons.

	1951		1953	
	Cap. in millions	Pct of Total	Cap.	Pct
Pittsburgh-Youngstown	41.4	39.7	45	38.2
Chicago	21.5	20.7	23.9	20.3
Cleveland-Detroit	9.6	9.2	12	10.2
Western	5.9	5.7	6.7	5.7
Southern	4.9	4.7	6.0	5.1
Eastern	20.8	20.0	24.2	20.5

Retires From Salem-Brosius

Pittsburgh—Sam Keener, former president of Salem Engineering Co., has announced his retirement from any participation in the management of Salem-Brosius, Inc. The company resulted from purchase of Salem Engineering by the Edgar E. Brosius Co., of Pittsburgh.

New Construction Shows Gain

Washington—With $2.5 billion worth of new construction going into place during May, the total for the first 5 months of 1951 rose to $11.1 billion. This was a 19 pct increase over last year, despite construction and materials controls.

Sharpest gain is registered in the industrial field, 104 pct. Construction of new and expansion of existing plants for defense purposes gave a 5-month total of $717 million against $351 for the same period in 1950.

Green River Outlines Financing

Washington—Green River Steel Corp., Owensburg, Ky., last week outlined financing plans for construction of a new steel plant, including a modern electric furnace and rolling mill.

In filing a registration statement with the Securities & Exchange Commission, the firm said it hoped to obtain more than $12.6 million from the following sources:

A first mortgage loan of $3,556,126 from RFC, a $5 million defense loan through NPA, $4 million from sale of 3½ pct debentures, $85,625 through sale of 342,500 shares of common stock (25 cent par) to company officials and 6 firms, and 320,000 shares of common stock to be offered to the public.

Plan Philippine Mine Expansion

Washington—A quarter-million of the $6.3 million in Marshall Plan funds authorized for the Philippine development program will be used for improvement and expansion of mining facilities.

Some 54 gold mines and 26 base metal mines were operating before the war. In 1951, only 7 gold and 16 base metal mines are in operation.

Sharon Switching to Diesels

Sharon, Pa.—The "Iron Horse" is on its way out at the plants of Sharon Steel Corp. Sharon has ordered 18 diesel locomotives and four diesel cranes that will cost $1,784,100.

Included will be 8 yard switchers of 800 hp, 2 yard switchers of 1200 hp, and 8 smaller units for use in the open hearth shops and mold yards. As the old engines are replaced they will be cut up and charged back into the furnaces.

Gear Makers Discuss Controls And Standards at AGMA Meeting

Hot Springs, Va.—Discussions of government price and materials regulations, and of engineering standards and definitions were the primary subjects of the 35th annual meeting of the American Gear Manufacturers Assn. held here on June 4, 5, and 6. The meeting also featured papers on "New Plastic Materials For Non-Metallic Gears," by F. R. Zumstein, Fellows Gear Shaper Co., and "Powder Metallurgy, A New Process for Manufacturing Gears," by Messrs. Lynch, Snodgrass, and Woodson, General Electric.

G. H. McBride

George H. McBride, manager, gearing div., Westinghouse Electric Corp., was named president of the AGMA. S. L. Cranshaw, Western Gear Works, was elected vice-president. L. B. Bond, Christiana Machine Co., was re-elected treasurer. Named to the executive committee were M. R. Anderson, Michigan Tool Co., C. R. Kessler, Beaver Gear Works, R. B. Holmes, Link-belt Co., and G. E. Gunderson, Brad-Foote Gear Works.

West Virginia Steel Gets Loan

Washington—RFC has approved a $3,750,000 loan for West Virginia Steel & Mfg. Co., of Huntington, W. Va.

The loan is the largest of the 119 transactions approved by RFC since W. Stuart Symington took office as administrator of the reorganized agency on May 7.

The steel firm told RFC it expected to spend $2,245,500 of the total amount approved for acquisition and installation of machinery and equipment required for steelmaking, $1 million for working capital, and $504,000 for construction of new buildings.

Industry Controls This Week:

NPA Orders

M-1, iron, steel castings—Producers must reserve 75 or 80 pct of steel castings and 60 or 65 pct of iron castings for DO rated orders. Sets 90-day lead time for affected alloyed iron products. Amended June 11, 1951.

M-26, Amend. 1, Aluminum closures—Clarifies order. Packers of alcoholic and nonalcoholic beverages limited in use of aluminum closures to 65 pct of 1950 use. Effective June 7, 1951.

M-46, M-46-B,—Sets up priorities assistance program for petroleum industry to tie in with CMP. Establishes separate construction order for the industry. Effective June 1, 1951.

M-50, Steel for utilities — Carbon and stainless steel added to materials (aluminum, copper) which may be obtained under DO-48. Sets third quarter quotas for uses other than major plant expansion. Effective June 5.

M-67, Aluminum foil—Limits aluminum foil manufacturers may use for protective wrapping. Effective June 1, 1951.

Del. 7, Del. 14, Construction—Delegates authority to eight Federal agencies to okay construction applications for projects under their jurisdiction (exclusive of List A in M-4). Establishes seven new field offices to administer M-4. Effective June 7, 1951.

OPS Orders

GOR-10, Amend. 1, Losses—Manufacturers who sustain loses in operation of separate plants as a result of CPR rulings may apply for adjustments. Effective June 7, 1951.

GOR 12, Anthrafilt, seacoal facing—Exempts items from price control. Effective June 11, 1951.

NPA Reminds Mills on Filing

Washington — Steel companies have been reminded by NPA that applications for aluminum, copper and steel for producing steel during the third quarter should be filed no later than June 16.

Fabricators Want Own CPR Order

Washington — Fabricators of structural steel shapes, plates and bars are asking OPS for a price order tailored to industry. Spokesmen say inclusion of their group under CPR 30 (machinery) is unfair since it calls for a pre-Korea base. They say business was slow then.

Industry officials would rather regulate margins on the basis of dollars per ton obtained in the last quarter of 1950. Variations in materials costs, and fluctuations in engineering and field erection costs have also snarled their pricing problem.

Wire, Cable Pricing Confused

Washington—It is possible price controls over wire and cable (now under CPR 30) may be shifted back under the GCPR and then to a new, tailored price order.

Industry spokesmen have told OPS price wars and the squeezing of some producers who voluntarily refrained from price rises, plus higher Chilean copper prices, have confused quotations.

Metals for Public Buildings

Washington — NPA early this week approved for third quarter delivery under CMP the following amounts of controlled materials to further the school, hospital, health and related construction programs:

Hospital and health programs—Carbon steel, 75,000 tons; stainless, 950,000 lb; copper and copper base alloys, 4,600,000 lb; aluminum, 550,000 lb.

School, library, other institutional—Carbon steel, 100,000 tons; stainless, 80,000 lb; other alloy, none; copper and copper base alloys, 600,000 lb; and aluminum, none.

Bearing Makers Ask More Metal

Washington — Increased set-asides of metals to meet bearings requirements have been asked of NPA. The industry claims sufficient supplies are not being obtained on authorized DO-70s.

Little more than appeals for individual relief will be open to bearing makers until after an industry survey has been completed by NPA, however. The agency will check (a) current production, (b) future scheduled output, and (c) planned additional production.

Mark 270,000 Tons of Steel For Power Industry Third Quarter

Washington—Approximately 270,000 tons of steel products have been earmarked for the electric power industry for third quarter maintenance and expansion.

NPA has already set aside some 75,000,000 lb of copper and 25,000,000 lb of aluminum for the same purpose.

Permitted third-quarter quota for minor requirements for steel products is limited to 18.75 pct of the amount of each type used by the individual company for the same purpose during 1950 or, as an alternative, 75 pct of the amount used during the corresponding quarter last year.

Similar limitations apply to copper and brass mill products. For aluminum, the quarterly use by type is restricted to 12.5 pct of the 1950 average or 50 pct of the corresponding quarter.

CMP Steps for Small Users

Washington — Under Dir. 1 to CMP Reg. 1, small users of steel, copper, and aluminum whose operations fall within CMP do not need specific NPA allocations for materials but may obtain them by use of the symbol "SU" if their quarterly requirements do not exceed the following amounts:

Carbon steel, including wrought iron, 5 tons; alloy steel, except stainless which must be allocated in every case, 1000 lb; copper and copper base alloy brass mill products, copper wire mill products, copper and copper base alloy foundry products and powder, 500 lb; and, aluminum, 500 lb.

Compressor Makers Ask Relief

Washington — The compressor industry has appealed to NPA through its industry advisory committee for relief from order M-61.

Specifically, the industry asks that M-61 be amended to increase iron and steel allocations from 105 pct to 145 pct; copper, from 100 pct to 140 pct; and, aluminum, from 95 pct to 135 pct.

DEFENSE CONTRACTS

Week of June 11, 1951

Truck crane—Hughes-Keenan Corp., Delaware, Ohio
Automatic screw machines—Brown and Sharpe Mfg. Co., Providence
Warehouse tractors—J. I. Case Co., Racine, Wisc.
Cylinder boring machine—Van Norman Co., Springfield, Mass.
Generators—Elliott Co., Crocker-Wheeler Div., Wash., D. C.
Airplane crash crane—R. G. LeTourneau, Inc., Peoria, Ill.
Radio receiving set—Electro Engineering & Mfg. Co., Detroit
Reels—Parrish Pressed Steel Co., Reading, Pa.
Mach'y, equipment—Western Electric Co., New York
Mach'y, equipment—Deepfreeze Appliance Div., Motor Products Corp., Chicago
Mach'y, equipment—The Gibson Refrigerator Co., Greenville, Mich.
Mach'y, equipment—Norma-Hoffman Bearings Corp., Stamford, Conn.
Mach'y, equipment—Murray Corp. of America, Detroit
Mach'y, equipment—General Electric Co., Erie, Pa.
Mach'y, equipment—Frigidaire Div., GMC, Dayton
Engine components—Firestone Steel Products Co., Akron, Ohio
Mach'y, equipment—Willys-Overland Motors, Inc., Toledo
Mach'y, equipment—Continental Motors Corp., Muskegon, Mich.
Mach'y, equipment—Willys-Overland Motors, Anderson, Ind.
Trailer parts—The Heil Co., Milwaukee
Truck parts—American Marsh Pumps, Inc., Battle Creek, Mich.
Cranes—Reiger Equipment Co., Inc., Urichsville, Ohio
Pump parts—Worthington Pump & Machy. Co., Harrison, N. Y.
Truck parts—Spicer Mfg. Co., Dana Corp., Toledo
Compressor parts—Champion Pneumatic Machy. Co., Princeton, Ill.
Trailers—Rogers Brothers Corp., Albion, Pa.
Tractors—Allis-Chalmers, Milwaukee
Tractors—Worthington Mower Co., Stroudsburg, Pa.
Earth augers—Buda Co., Harvey, Ill.
Tractors—International Harvester, Melrose Park, Ill.
Scrapers—Gar Wood Indus., Wayne, Mich.
Tractors, trailers—M-R-S Mfg. Co., Flora, Miss.
Drills, pneumatic—Independent Pneumatic Tool Co., Aurora, Ill.
Trucks—Four Wheel Drive Co., Clintonville, Wisc.
Engine—Hercules Motors Corp., Canton 2, Ohio
Trucks, pickup—Chevrolet Motors Div., Detroit
Motors, gearmotors—General Electric Co., Wash., D. C.
Winches—Almon A. Johnson, Inc., New York
Signal generators—Federal Mfg. & Eng. Corp., Brooklyn, N. Y.
Fans—LeJohn Mfg. Co., Huntington, W. Va.
Indicators—Kollsman Instrument Corp., Washington 6, D. C.
Indicators—Aviation Engineering Corp., Woodside, N. Y.
Parts, Pratt-Whitney engines—Bendix Aviation Corp., South Bend, Ind.
Parts, aircraft—Grumman Aircraft Engineering Corp., Bethpage, N. Y.
Tank automotive parts—Chiksan Co., Brea, Calif.
Tank automotive parts—Mattel, Inc., Culver City, Calif.
Dynamometers—Clayton Mfg. Co., El Monte, Calif.
Synchros—General Electric Co., Schenectady, N. Y.
Portable floodlight units—Thomas A. Edison, Inc., New York
Diesel engine repair parts—The Cooper-Bessemer Corp., Mount Vernon, Ohio
Parts, steam turbines—Dravo Corp., Philadelphia
Parts, diesel engines—Norberg Mfg. Co., Busch-Sulzer Bros., Diesel Engine Co., St. Louis

Continued

Willys-Overland Will Lease GSA's Aluminum Forging Plant

Washington — General Services Administration will reactivate its aluminum forging plant at Erie, Pa., under a lease contract being worked out with Willys-Overland Co.

Administrator Jess Larson said the plant is fully equipped and should be in production within 60 days. It has a rated capacity of 15 million lb of forgings annually.

The Erie plant is the last of the aluminum facilities held by GSA.

Have Heat Treating Capacity

Pittsburgh—Approximately 350 batch type and 250 continuous monorail type enameling furnaces in the U. S. could be used for heat treating steel and aluminum defense items, the Porcelain Enamel Institute reports.

Prompted by indications furnace builders may not be able to keep up with demands, the report has outlined procedures for converting furnaces to defense work. Enameling furnaces have pickling facilities which could be used for cleaning metals, the report states.

Seacoal Facing Not Price Bound

Washington—OPS has exempted seacoal facing from price control. Since its cost in casting and in foundry operations represents less than 1/10 of 1 pct of the current prices, and since there is no shortage of the commodity, administration of price controls would be more trouble than it was worth, OPS said.

Small Firms Get Navy Contracts

Washington — Navy Dept. last week announced the letting of 8 "small business" contracts involving construction of 102 barges for a total package cost of $2,000,000.

Contracts were awarded to Bushness Steel Co., Jacksonville; Jafra, Inc., Miami; and Bushnell-Lyons Iron Works, Tampa; Northeastern Boiler Works, Green Bay; Kargard Boat & Engine Co., Marinette, Wis.; Augusta Iron & Steel Works, Augusta, Ga.; Gary Steel Products Corp., Richmond; and Central Steel Construction Corp., Buffalo.

Gray Market Survey Planned

Birmingham—A "just in case" survey of possible gray market metals operations will be made here soon by the National Production Authority. While no reports of gray market deals have been heard, NPA wants to know the score anyway. Local steel producers have guarded against sooty sales by requiring all customers, exclusive of those receiving DO orders, to sign a clean-hands agreement.

Allocate Moly Concentrates

Washington—Under DMA order M-8, molybdenum concentrates have been placed under allocation control. After June 30, shipments may be made only upon DMA's authorization.

Roasted concentrates are already under control. The new order applies to concentrates containing 30 pct or more of the metal when the proposed shipment consists of 200 lb or more.

Contract for New Type Shell

Philadelphia — A new 90-millimeter high-explosive shell with a tracer element built in the base will be produced by L. S. Young Spring & Wire Corp. under a $7,356,771 contract announced by the Philadelphia Ordnance District. Path of the shell will be visible from the time it leaves the gun.

South to Make Rifle Barrels

Birmingham—For the first time since the Civil War rifle barrels will be made in the South. The Southern Line Material Co. has been granted a "cost-plus" contract by the Defense Dept. to manufacture .30 caliber rifle barrels. The plant will produce 150,000 barrels a month.

Exports of Steel, Aluminum, Copper Licensed Under CMP

Washington—Exports of steel, copper, and aluminum produced after June 30 will be licensed against export quotas set up under CMP.

Third quarter quotas for controlled materials have been set as follows: Carbon steel, 479,150 tons; alloy steel, 18,850 tons; stainless steel, 4,000,000 lb; tin plate, 125,000 tons; copper and copper alloy, 7,500,000 lb; aluminum, 2,500,000 lb.

Beginning June 1, ratings will be assigned by OIT for procurement if the above materials are not already in the exporter's possession. DO-36 ratings will be assigned to deliveries to ECA nations; DO-37 will be assigned for other countries except Canada, which will continue under jurisdiction of NPA.

Kennametal Gets Shell Order

Latrobe, Pa.—Kennametal, Inc., will make 76 mm. high-velocity, armor-piercing shells under a new government contract. The cemented tungsten carbide shells will be produced under a $4 million contract awarded by the Pittsburgh Ordnance District.

New Iron & Steel Div. Official

Washington—Wallace B. Quail, of Armco Steel Corp., has been made deputy director of the Iron and Steel Division of the National Production Authority. Mr. Quail has been on loan to NPA since October 1950. He was manager of Armco's Central Sales area.

Plan Illinois Jet Engine Plant

Chicago—Expenditures for industrial expansion planned in the Chicago area during May totaled $37,115,000, according to the Chicago Assn. of Commerce and Industry. Contemplated projects announced this year call for an investment of $211,965,000.

Weir Hits "Snide Politics"

New York — Ernest T. Weir, chairman, National Steel Corp., called on businessmen to apply the "jet plane thinking" they use in business to their political awareness and activities. Mr. Weir, a Republican, criticized both parties for inept handling and "snide politics" in the MacArthur affair.

Problems of the steel industry, and industry in general, are only a part of the great problem of our time, Mr. Weir said. Big problem, he pointed out, is how to live in reasonable peace and security with ourselves and other nations of the world.

Referring to materials supplies, Mr. Weir said shortages, if they develop, will be in materials other than steel, and in manpower.

Ohio Seamless to Add Facilities

Cleveland—Ohio Seamless Tube Co., Shelby, Ohio, has awarded a plant expansion contract for $2,500,000. Improvements will include a rotary furnace 48 ft in diameter for heating billets, a building to house the furnace and a large electric motor for driving the mill.

Other equipment includes a heavy-duty billet piercer and equipment for the present seamless tube mill.

ASM Names Chipman President

Cleveland — Dr. John Chipman has been named president of the American Society for Metals. Dr. Chipman is head of the Dept. of Metallurgy of Massachusetts Institute of Technology. Other new officers include: Ralph L. Wilson, vice-president; Ralph L. Dowdell, treasurer; George A. Roberts and J. B. Johnson, new trustees.

T. E. Millsop Reelected Mayor

Weirton, W. Va. — Thomas E. Millsop, president of Weirton Steel Co., recently reelected mayor of the City of Weirton, will give back to the city his entire $2000 salary for the 4-year term. This is a $1 improvement over the $1999 he turned back in his first 4-year term.

Canada Sets Quarterly Record For Steel Ingot, Casting Output

Toronto — Canadian production of steel ingots and castings set a new monthly high record in March at 314,826 net tons, a daily average of 93.2 pct of total capacity. This compares with 281,380 tons or 92.2 pct for February and 294,303 tons or 87.1 pct for March 1950. March output included 304,281 tons of steel ingots and 10,545 tons of steel castings.

First quarter production of steel ingots and castings was at the record quarterly rate of 905,859 net tons, compared with 842,375 tons in the same period of 1950 and with 812,881 tons in 1949.

Trend to Man-Created Metals

Detroit—Carboloy Co., Inc., will become the Carboloy Dept. of General Electric Co. on June 30. This points to a "vast potential expansion" of the organization's activities, capacity, and products, said K. R. Beardslee, former Carboloy Co. president who will continue as general manager of the department.

He said the age of metals is taking a trend to man-created metals, the work of science. Industry has already adopted several of these new metals, such as carbides, permanent magnet metals, and radiation-resistant Hevimet, which is heavier than lead and very dense.

May Organize New Steel Company

Buffalo—Colorado Fuel & Iron Corp. may organize a new steel company here to be known as Frontier Steel Co. The firm has for some time been considering a completely integrated plant in this area.

C.F.&I. is reported to have on file with DPA a certificate of necessity for fast tax write-off for a $109 million plant. The facilities would include a large sheet and strip mill. The new plant would be built on a 175-acre site adjoining the Wickwire Spencer plant in River Road.

Fast Tax Write-Offs Total 1512; Estimated Cost $5.8 Billion

DPA approves 87 new certificates of necessity from May 26 to June 1

Washington — Defense Production Administration approved certificates of necessity for construction of 87 new or expanded defense facilities between May 26 and June 1. Cost of the projects is estimated at $89 million.

A total of 1512 certificates were approved by DPA as of June 4. Aggregate amount eligible for fast tax write-off is $5,864,432,661. Of certificates granted, one-third are for projects costing $500,000 or less.

Certificates included in the latest report of DPA, listed by company, use, amount applied for, amount eligible, and per cent approved, are:

United States Steel Supply Co., reinforcing bars, $17,000, $17,000, 60.

Scovill Mfg. Co., fasteners, $30,834, $30,834, 75.

Transicoil Corp., induction generators, $11,860, $11,860, 90.

The Voss Co., propeller studs, plugs, $11,688, $11,688, 90.

Goodyear Tire & Rubber Co., processing scrap rubber, $464,123, $464,123, 70.

Werner Machine Co., Inc., machine tools, $15,959, $15,959, 90.

Kasle Iron & Metals, Inc., scrap iron, $22,000, $22,000, 75.

Ash Grove Lime & Portland Cement Co., portland cement, $3,322,700, $3,322,700, 70.

Material Service Corp., barges, $458,700, $458,700, 50.

Gates Rubber Co., rubber hose belting, $483,883, $483,883, 70.

Dow Chemical Co., hydrochloric acid: $4,475,000, $4,475,000, 70; $3,535,000, $3,535,000, 70.

Pequanoc Rubber Co., reclaim rubber, $236,022, $216,522, 70.

Crucible Steel Co. of America, transportation, $403,524, $403,524, 70.

Murdock Machine & Engr. Co., Inc., airplane parts, $91,750, $88,548, 80.

Daystrom Electric Corp., ordnance, $1,804, $1,804, 85.

B. F. Goodrich Co., airplane parts, $41,850, $41,850, 75.

Colorado Fuel & Iron Corp., hoists, $241,484, $241,484, 60.

Koppers Co., Inc., ethylbenzene, $4,704,000, $4,475,355, 70.

Higman Towing Co., transportation: $281,625, $48,425, 80; $233,200, 70.

John A. Roebling's Sons Co., steel wire, $300,100, $300,100, 60.

Upper Mississippi Towing Corp., tow barges, $412,658, $412,658, 70.

Solar Corp., storage batteries, $9,505, $9,505, 75.

Gudeman Co., capacitors, $2,504, $2,504, 75.

Harnett Electric Corp., ordnance, $6,210, $6,210, 75.

C.G.S. Laboratories, Inc., ordnance, $9,665, $9,665, 85.

Marquette Metal Products Co., aircraft parts, $93,809, $92,929, 90.

T. M. Chapman's Sons Co., engine parts, $20,916, $20,916, 90.

B. F. Goodrich Co., airplane wheels, $32,550, $32,550, 75.

Boston Land Co., ginning of cotton, $185,873, $185,873, 65.

New York Central R.R. Co., transportation, $3,034,500, $3,034,500, 80.

Phoenix Trimming Co., parachute harness, $400,000, $400,000, 60.

Langdon Mfg. Co., latch assembly, $6,495, $6,495, 90.

Interlake Steamship Co., transportation, $6,250,000, $6,250,000, 80.

Warren Petroleum Corp., transportation, $2,677,500, $2,677,500, 80.

Gibson Refrigerator Co., tail cones-ailerons, $2,746,123, $2,746,123, 75.

Crucible Steel Co. of America, bars, sheets, $1,042,111, $868,426, 65.

American Smelting & Refining Co., Slab zinc, $2,254,000, $2,254,000, 60.

Sier-Bath Gear & Pump Co., Inc., precision gears, $96,473, $96,473, 85.

Walter Kidde & Co., Inc., gunchargers, $16,000, $16,000, 75.

Wyman-Gordon Co., aircraft, $2,839,626, $2,814,626, 75.

Chicago, Rock Island & Pacific R.R., transportation, $10,443,126, $10,443,126, 65.

Cincinnati, New Orleans & Texas Pacific R.R. Co., transportation, $18,900, $18,900, 65.

Kaiser Aluminum & Chemical Corp., ferrosilicon, $410,000, $410,000, 75.

Youngstown Sheet & Tube Co., pig iron, $975,000, $975,000, 85.

West Boylston Mfg. Co. of Alabama, cotton yarn, $173,863, $173,863, 50.

Kaiser Aluminum & Chemical Corp., aluminum alloy ingot, $1,158,700, $1,158,700, 60.

Youngstown Sheet & Tube Co., steel sheets, $770,000, $770,652, 60.

Herschede Hall Clock Co., tank periscope, $466,833, $466,833, 80.

Sturgess, Inc., aircraft, $151,866, $147,866, 80.

Lansing Die Sinking Co., forging dies, $48,055, $48,055, 90.

Phillips Chemical Co., carbon blacks, $4,708,074, $4,668,999, 60.

Boeing Airplane Co., airplane parts, $16,243, $15,577, 75.

Standard Oil Co. (Ohio), gas propane, butane, $4,230,000, $4,230,000, 70.

Wilson Transit Co., transportation: $910,243, $910,243, 80; $875,243, $875,243, 80; $531,500, $531,500, 80.

Charles H. Besly & Co., machine tools, $659,291, $659,291, 80.

General Atlas Carbon Co., carbon black, $1,562,050, $1,545,050, 60.

Continental Oil Black Co., carbon black: $1,890,500, $1,890,500, 60; $1,514,300, $1,514,300, 60.

Cabot Carbon Co., carbon black, $732,028, $732,028, 60.

J. M. Huber Corp., carbon black, $2,445,664, $2,211,242, 60.

Cabot Carbon Co., carbon black, $2,174,380, $2,174,380, 60.

United Carbon Co., carbon black, $2,300,000, $2,290,000, 60.

Columbian Carbon Co., carbon black, $1,700,000, $1,670,000, 60.

Hetherington, Inc., aircraft, $20,494, $20,494, 90.

Foote Bros. Gear & Machine Corp., aircraft, $127,795, $127,795, 90.

Knapp-Monarch Co., pressure primer bulbs, $4,053, $4,053, 90.

Bock Mfg. Co., metal stampings, $3,714, $3,472, 90.

Mid-West Refineries, Inc., octane gasoline, $993,700, $993,700, 75.

Monument Engineering Co., Inc., drip valves, $7,600, $7,600, 90.

National Water Lift Co., airplane parts, $179,700, $179,700, 75.

Tru-Ber Mfg. Co., aircraft parts, $78,328, $71,158, 80.

Fuller Mfg. Co., automotive transmissions, $942,420, $860,670, 80.

Petroleum Specialties, Inc., gasoline, $700,000, $700,000, 70.

USS Sets Ingot Output Record

Chicago — The United States Steel Co. established an all-time monthly steel ingot output record in May when 2,056,262 tons of ingots came from furnaces of the Pittsburgh and Chicago district plants. The Chicago district's contribution was represented by an all-time record of 992,242 tons of steel ingots at the South Chicago and Gary plants.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

1560 **Tons,** Kenosha, Wis., Nash Kelvinator Bldg. No. 44, to Worden-Allen Co., Milwaukee.

1500 **Tons,** Reading, Pa., rolling mill building and other plant expansion work at Carpenter Steel Co., Belmont Iron Works, general contractors.

675 **Tons,** Pottstown, Pa., resin plant at Firestone Plastics Co., to Bethlehem Steel Co., Bethlehem.

105 **Tons,** Crookston, Minn., bridge No. 6704 to American Bridge Co.

Fabricated steel inquiries this week included the following:

10,939 **Tons,** Boston, Mass., Boston Connection to Boston Central Artery, steel superstructure. Completion date Dec. 31, 1953. This includes 7378 tons of structural carbon steel for floor system and bracing; 2772 tons of structural carbon steel for bents; 696 tons of structural silicon steel for bents; and 92 tons of structural silicon steel for floor system of bracing.

500 **Tons,** Johnsville, Pa., development and testing facilities building at Naval Air Development Center, bids due June 19.

Reinforcing bar awards this week included the following:

1800 **Tons,** Ft. Randall, N. D., Reservoir, U. S. Engineers, to Sheffield Steel Co.

580 **Tons,** Philadelphia, machine shop for Budd Mfg. Co., Wark & Co., same city, general contractors, to Bethlehem Steel Co., Bethlehem.

460 **Tons,** Chicago, Resurrection Hospital, to Jos. T. Ryerson and Son.

400 **Tons,** Ashtabula, Ohio, Electro Metallurgical Co., to U. S. Steel Supply Co.

400 **Tons,** Philadelphia, Catapult No. XC 10 for Naval Air Materiel Center Hughes, Foulkrod & Co., same city, general contractors, to Bethlehem Steel Co., Bethlehem.

325 **Tons,** Philadelphia, Minnie Kendrick School, McCloskey & Co., same city, general contractors.

300 **Tons,** Byberry, Pa., warehouse building for Philadelphia State Hospital, Stoffiet & Tillotson, Philadelphia general contractors.

285 **Tons,** Lincolnwood, Ill., Bell and Howell addition, to Jos. T. Ryerson and Son, Chicago.

254 **Tons,** Boston, Mass., substructure for single and double deck elevated highway, C. J. Maney Co., Inc., Somerville, Mass., low bidder.

210 **Tons,** Aurora, Ill., high school to Ceco Steel Products Co., Chicago.

200 **Tons,** Overbrook, Pa., foundations only for Lankenau Hospital, Wark & Co., Philadelphia, general contractors, to Bethlehem Steel Co.

Reinforcing bar inquiries this week included the following:

750 **Tons,** Boston, Boston connection to Boston Central Artery, substructure and approaches.

500 **Tons,** Chi., Pioneer Paper Stock Co.

400 **Tons,** Maple Grove, Ohio, basic refractories.

330 **Tons,** Milwaukee, Marquette University library.

250 **Tons,** Rock Island, Ill., St. Anthony Hospital boiler house.

200 **Tons,** Ft. Atkinson, Wis., high school addition.

160 **Tons,** Milwaukee, 66th Street school.

150 **Tons,** Gary, high school.

100 **Tons,** Milwaukee, Marquette University high school residence hall.

Steel plate inquiries this week included the following:

138 **Tons,** Boston, Mass., Boston connection of Boston Central Artery steel superstructure. Dec. 31, 1953, completion date. This is steel traffic plate at extension joints.